

ROADS *and* STREETS

HIGHWAYS • BRIDGES • AIR FIELDS • HEAVY CONSTRUCTION

A GILLETTE PUBLICATION

Gillette Publishing Co., 22 West Maple St., Chicago 10, Illinois • Accepted as Controlled Circulation Publication at Milwaukee, Wis.



Cover Scene: Fast-swinging small shovels keep crusher supplied (see page 29). In This Issue: Latest on earthmoving tires . . . Cement-treated base, centrally mixed . . . 24 other "how it was done" stories, technical reviews and convention reports.

April 1957

still
going
strong...



Eight years of tough, continuous operation—with minimum care and maintenance—yet this Chrysler-powered Pettibone Mulliken Speedloader has never failed to meet a work day schedule.

"We use it mostly for loading pea gravel," says J. L. Pharr, Supervisor Shop #3, Dallas (Texas) County Road Commission, "but at one time or another it's been used for almost everything—even hauling 48" concrete pipe. It hasn't been treated with any respect, either. Everybody but the bookkeeper has operated it . . . and any machine used like that has a right to break down *but this one hasn't!* In fact, on any of the equipment we operate we've never had a Chrysler Engine fail!"

The Payoff Power
is Chrysler

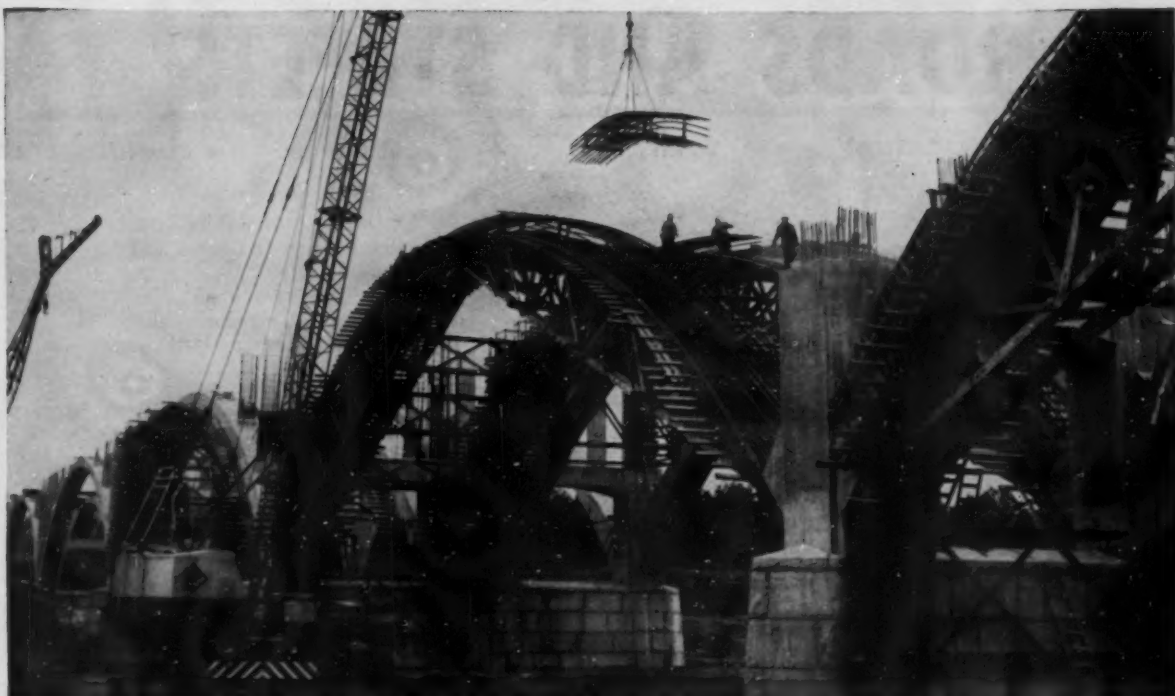


CHRYSLER INDUSTRIAL 33, in-line 6 (265 cu. in. displacement) Engine powers many makes of equipment in the construction and materials handling fields. There are five Chrysler in-line 6s, two V-8s—ranging from 230 to 354 cu. inch displacement. For detailed information about Chrysler Industrial Power, write: Dept. G4, Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.

Chrysler
INDUSTRIAL ENGINES

INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION

... for more details circle 221, page 16



Construction of the reinforced-concrete arches of the bridge carrying the new Route 22 By-Pass over the Schuylkill River at Hamburg, Pa. General contractor: F. D. Kessler, Inc., Northumberland, Pa. Bridge contractor: J. Richard Nissley, Inc., Landisville, Pa.

Two New Highway Bridges in Pennsylvania

Shown here under construction are two important new highway bridges in Eastern Pennsylvania. One (*see cut at right*) is a bridge near Lehigh, Pa., over Pohopoco Creek and the Lehigh River, with spans of 920 ft and 1500 ft, respectively. This bridge is part of the Northeast Extension of the Pennsylvania Turnpike, running from Philadelphia to Scranton.

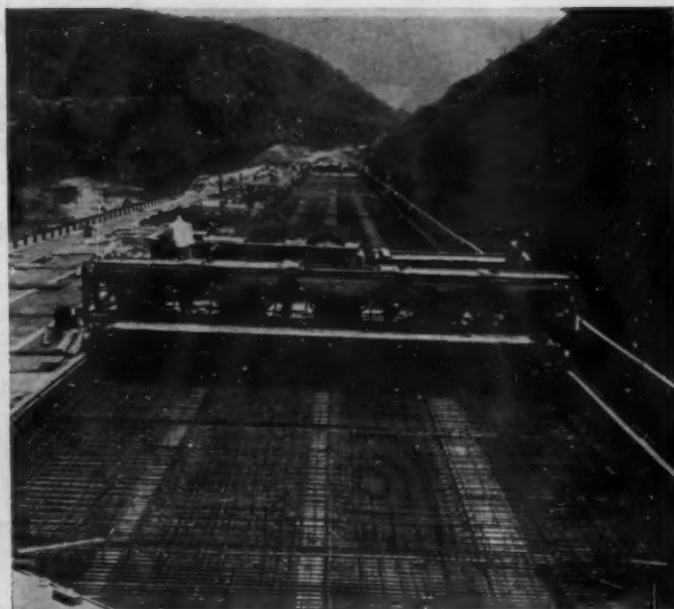
The other bridge (*above*) carries an extension of the Route 22 By-Pass over the Schuylkill River near Hamburg.

For the road beds and approaches to both these bridges, Bethlehem supplied a substantial tonnage of highway steels. These steels include dowel units and bar mats, deformed reinforcing bars and accessories, hook bolts and guard rail.

Have you seen our big illustrated booklet, "Steel for Highways"? It describes fully the complete Bethlehem line of road steel products. Contractors find it informative and helpful. You can obtain a copy by writing either to Bethlehem, Pa., or to the nearest Bethlehem sales office.

BETHLEHEM STEEL COMPANY BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation



Pouring the road bed of the Pohopoco Creek-Lehigh River bridge on the Northeast Extension of Pennsylvania Turnpike. Contractor: J. Richard Nissley, Inc., Landisville, Pa.

BETHLEHEM STEEL



... for more details circle 211, page 16

ROADS AND STREETS, April, 1957

ROADS AND STREETS

A GILLETTE PUBLICATION

APRIL, 1957

VOLUME 100

NUMBER 4

NATIONAL AFFAIRS

- Washington News Letter..... 19
By Duane L. Cronk, Washington Editor

EDITORIAL

- Home-Made Equipment vs. Factory Models.. 73

EARTHMOVING AND EXCAVATION

- Berm Helps Confine Blast Along Rail Line.. 59
Third in Series on Connecticut Turnpike
Rock Excavation

PAVING AND SURFACING

- Central-Mix for Cement Treated Base..... 64
By H. K. Glidden, Contributing Editor
Status of Flexible Pavement Design for
Military Aircraft.....153
By Arvin S. Wellborn, Chief Engineer,
The Asphalt Institute
Coring Concrete for Contractor Payment
By F. C. Withoski, Testing and Research Engineer,
Pennsylvania Dept. of Highways
Plant Owners Need More "Savvy" on
Hot-Mix Design and Control.....210
By S. B. Hudson and W. B. Warden, Miller-
Warden Associates, Consultants
An Asphalt Engineer Analyzes Kelly Field
Pavement Failure.....216

BRIDGES AND STRUCTURES

- Heavy Pile Hammers Handle Big Job..... 90
Novel Steel Forms for "T" Piers.128
Special Design Cuts Form Costs for Viaduct..134
16 Pipe Arches Replace Old Trestle.....155

NORTH ATLANTIC STATES MEETING

- Girding for the Big Right-of-Way Job..... 76
Quick Action Needed to Modernize
Highway Laws 79

EQUIPMENT APPLICATION

- What Contractors Should Know
About Construction Tires.....109
By Frank W. Fox, Truck Tire Department,
Goodyear Tire & Rubber Company

- How To Extend Life of Cables..... 72
Cutting Concrete with Diamond and
Abrasive Blades..... 96
By J. H. Denton and J. I. Jenkinson,
The Carborundum Company
Familiar Scaffolding Doing Many
Highway Jobs.....160

JOB AND EQUIPMENT IDEAS

- (Eight Items of Timely Interest).....169

JOB ACCIDENT PREVENTION

- AGC Contractors Set Job Safety Record.....122
As heard at Association's recent annual meeting

OTHER SUBJECTS

- New Type Steel Curb Easily Installed..... 85
Storm Sewer Built in Deep Open Cut..... 86
California Institute Develops Manual
Kneading Compactor.....106
Photogrammetry to Require \$200
Million Expenditure.....175

DEPARTMENTS

- Headlines on Highway Development..... 29
New Publications..... 50
Personals100
Letters From Readers.....222
Engineering Digest.....141
By John C. Black, Associate Editor
Court Decisions of Interest to Contractors...147
Views and Comments.....209
By H. G. Nevitt, Contributing Editor

WHERE TO BUY IT

- Reader Coupon Page..... 16
What's New in Equipment and Materials...178
Manufacturers' Literature.....203, 226
Clearing House (Used Equipment).....229
With the Manufacturers and Distributors...241
Advertisers' Index244

Coming Articles

How the "Big Cut" Job is Progressing
Some of the details of equipment and methods
being worked out by Ferry & Crow on the 9¼-
million cubic yard highway cut, for U. S. 40 reloca-
tion in California (see initial report, May '56, and
Cover Scene, January '57 issues of Roads Streets).

How and Where to Light a Turnpike
Lighting details for the Florida Turnpike's inter-
changes toll plaza and service areas will be de-
scribed, together with electrical hook-up details of
great interest to designers of Interstate projects.

Design of Prestressed, Pre-Tensioned Concrete
A design problem worked out in detail on a type of
small-span bridge deck such as will be employed
increasingly throughout the highway field.

... And Many Other Subjects
Iowa's Pavement Widening Program ... Bridge
Girders Set by Leaning Highline ... Three Miles
of Test Piles Driven to Determine Pile Lengths ...
Treating a Huge Slide Area; a Case Report ...
Echoes from AGC's Annual Convention in Wash-
ington.

Accepted as Controlled Circulation Publication at Milwaukee, Wisconsin. Published monthly. Subscription \$5.00 per year.



**4-MILE ROUND TRIPS EVERY 15 MINUTES---
INCLUDING LOADING AND DUMPING 50 TONS OF COAL!**

**GOODYEAR
IS THERE**

ROUGH LIMESTONE ROADS, hills and high speeds demand careful, competent tire maintenance. Sunnyhill speeds it with this portable hoist.



THIS RIGOROUS NONSTOP PACE typifies the fast-stepping strip-mining operation of Sunnyhill Coal Company at its Rehobeth, Ohio, mine. Daily take-out varies according to demand and availability of railroad cars—but ten 50-ton trucks and one 60-tonner average a yearly total of over 1 million tons! During its 25 years in business, Sunnyhill has always been conscious of tire expense and has gone more and more to Goodyears to help reduce costs.

Now Sunnyhill is switching to Goodyear's **3-T Nylon Cord TUBELESS!**

Yes—now Sunnyhill specifies Goodyear 3-T Nylon Cord TUBELESS on all new equipment!

The reasons, according to Clayton Busse, Equipment Manager, are that in Sunnyhill's tests TUBELESS Goodyear tires ran 10 to 15° cooler in 80° weather—they have less down time from flats—and over-all tire performance is better.

Goodyear TUBELESS tires are standard, or can be specified, on foremost original equipment, *no matter how large*. For change-over of present equipment, contact any Goodyear dealer. Goodyear, Truck Tire Dept., Akron 16, Ohio.

Buy and
Specify

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

All-Weather, Road Lug, Sure-Grip—T. M. © The Goodyear Tire & Rubber Company, Akron, Ohio

... for more details circle 242, page 16
ROADS AND STREETS, April, 1957

**Now in Triple-Tough
Triple-Tempered 3-T Nylon Cord
—Tubeless or Tube-Type!**



**HARD ROCK
LUG**

**ALL-WEATHER
EARTHMOVER**

ROAD LUG

**SURE-GRIP
LUG**



Look for this nearby Goodyear dealer sign
for better tire values—better tire care.

LOW-COST SONOTUBES®

form 3-foot diameter concrete
piers for overpass bridge!



Overpass for side roads, New Hampshire Turnpike, Dover, N.H., State of N. H., owner.
Landers and Griffin, contractors. Hayden, Harding & Buchanan, engineers. Photo by Zambella.

SONOTUBE®

FIBRE FORMS

for round columns of concrete

Both 36 and 30 inch SONOTUBES were used as formwork for the round concrete piers of this highway overpass bridge on the New Hampshire Turnpike. Forming for caps tie-in easily with the fibre forms of the supporting piers

SONOTUBES save the contractor time, labor and money.

SONOTUBES are approved by architects and engineers and are widely used by contractors everywhere. SONOTUBES are specifically designed for use in the construction of piers, piles, underpinning and other structural uses.

Order SONOTUBE Fibre Forms for your next job . . . available in sizes from 2" to 48" I.D. up to 48' long. Can be supplied in specified lengths or sawed to size on the job. For finished columns, order Sonoco's patented "A-Coated" SONOTUBES; wax-coated also available.



For complete technical information and prices . . . write

SONOCO PRODUCTS COMPANY

CONSTRUCTION PRODUCTS DIVISION

HARTSVILLE, S. C.

LOS ANGELES, CAL.

8955 SOUTH WESTERN AVE.

MONTCLAIR, N. J.

14 SOUTH PARK STREET

AKRON, IND. • LONGVIEW, TEXAS • BRANTFORD, ONT. • MEXICO, D. F.

. . . for more details circle 294, page 16

ROADS AND STREETS

Devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; the construction and maintenance of airports. Represents 65 years of continuous publishing in the highway field; combined with Engineering and Contracting and Good Roads Magazines, established in 1892.

HAROLD J. MCKEEVER, *Editor-in-Chief*
V. J. BROWN, *Vice Pres. and Coordinator*
CHARLES T. MURRAY, *Managing Editor*
JOHN C. BLACK, *Associate Editor*
JACK H. GOULD, *Associate Editor*
H. K. GLIDDEN, H. C. PERSONS,
H. G. NEVITT, C. R. SHUPE,
Contributing Editors
DUANE L. CRONE, *Washington Editor*
JAMES R. CUMMINGS, *Assistant Editor*
GEORGIA ZOGRAPOS, *Editorial Secretary*

EPA

GILLETTE PUBLISHING COMPANY

Publication and Editorial Offices:
22 West Maple Street, Chicago 10, Ill.

HALBERT P. GILLETTE
President and Publisher
V. J. BROWN, *Vice President*
F. H. G. FORSYTHE, *Vice President*
HALBERT S. GILLETTE
Vice President and Assistant Publisher

Chicago Office: 22 West Maple St.
Superior 7-1581

R. T. Wilson, *Gen. Sales Manager*
Fred H. Bowes, *Representative*
Morgan E. Cottingham, *Representative*
E. Bender, *Clearing House Manager*
J. L. Latta, *Production Manager*
L. R. Vickers, *Circulation Manager*
S. Provus, *Research Director*

New York Office: 87 Wolf's Lane,
Pelham, N.Y., Pelham 8-3200

F. A. Michel Jr., *Eastern Manager*

Cleveland Office: 516 The Arcade
Cherry 1-5638

Ray Keine, *Manager*

Pasadena Calif: Sycamore 4-6328

West Coast Office: 1126 Del Rey,
J. A. Osborne, *Manager*

OTHER GILLETTE PUBLICATIONS

Magazines

Rural Roads • Street Engineering
Bituminous Roads and Streets
World Construction
Camino y Construcción Pesada

Profiled Catalogs

Heavy Construction (U.S. & Canada)
World Construction (International)
Construction Pesada (Latin)



Buffalo-Springfield 3-Wheel Roller on a widening and bituminous resurfacing job.

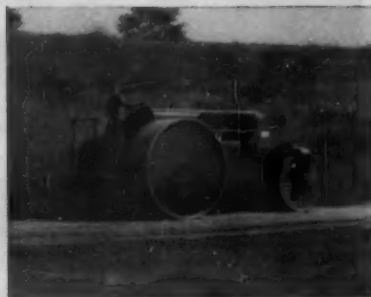
To compact largest variety of material, use Buffalo-Springfield's 3-Wheel Roller

Buffalo-Springfield Heavy-Duty 3-Wheel Rollers are long-time favorites for handling the wide variety of materials found in fills, subgrades and bituminous pavements. Variable weights in 10-14 and 12-15 ton sizes, power roll brakes, tapered roller bearings on *all* rolls . . . assure widest range of use, unequaled safety, maximum maneuverability, smoothest performance and longest operating life.

The Buffalo-Springfield 3-Wheeler's time-proven 4-speed transmission is an unmatched assembly

built for outstanding performance and durability under severe load conditions. Torque converter drive with 2-range transmission is also available as optional equipment.

When *one* roller must do *many* jobs, the Buffalo-Springfield 3-Wheel Roller is your best buy. Ask your nearest Buffalo-Springfield distributor today for all the reasons *why* Buffalo-Springfield 3-Wheel Rollers are top choice for multi-purpose compaction regardless of the type of material to be compacted.



This 3-Wheel Buffalo-Springfield Roller is compacting earth fill for new pavement.



Buffalo-Springfield 3-Wheel Rollers speed compaction on fill consisting primarily of slate refuse from a coal mine.



Here a Buffalo-Springfield 3-Wheel Roller compacts crushed stone base for new highway.

**Write today for a copy of
the new 3-Wheel Roller
Bulletin, S-72-156.**

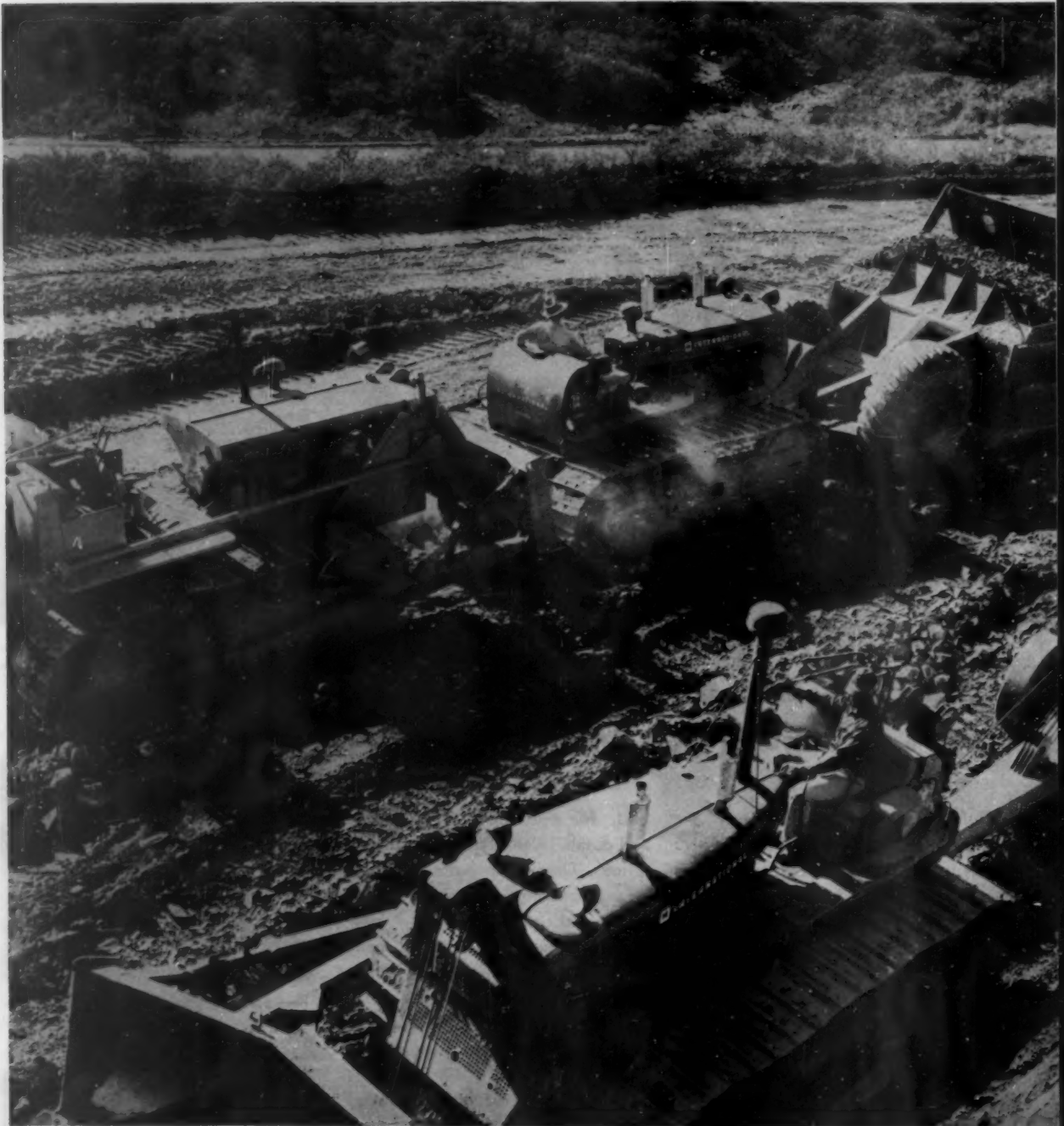


BUFFALO-SPRINGFIELD ROLLER CO.

DIVISION OF KOEHRING COMPANY • SPRINGFIELD, OHIO

. . . for more details circle 214, page 16
ROADS AND STREETS, April, 1957

How effective




TUNE IN:
METROPOLITAN
OPERA
radio broadcasts
every Saturday afternoon



TEXACO

lubrication keeps jobs on schedule



TO MEET JOB DEADLINES, your equipment must deliver consistently smooth, dependable performance. That calls for really effective lubrication — *Texaco*. And here are some names to remember:

Texaco Marfak for chassis lubrication. World-famous for its ability to *stay in* the bearings, even under heavy shock loads. Protects parts against wear and rust for hundreds of extra miles.

Texaco Marfak Heavy Duty 2 for wheel bearing lubrication. Seals itself in, seals out dirt and mud for longer bearing life, more miles between repackings, safer braking. No seasonal change needed.

**MORE THAN 650 MILLION POUNDS
OF TEXACO MARFAK HAVE BEEN SOLD.**

Texaco Universal Gear Lubricant EP for smoother-working transmissions and differentials . . . *Texaco Track Roll Lubricant* for low-cost protection of crawler mechanisms.

Texaco Simplified Lubrication Plan for an easy way to handle *all* major lubrication with *no more than six* Texaco Lubricants. You avoid errors, save time and money. Get full details from a Texaco Lubrication Engineer. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.

NEW MULTI-PURPOSE MARFAK

Texaco Marfak Heavy Duty Special 2 is specially designed for all grease-lubricated bearings. This lithium-base lubricant pumps easily and lubricates effectively even at low temperatures. It resists water, has a long service life.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT



*"Material-handling worries ended," reports
leading Wisconsin building contractor*

TIME, LABOR COSTS CUT IN HALF by versatile Michigan Tractor Shovel

Savings of 40 to 90% in time and 50 to 75% in labor costs resulted when the Selmer Company, Green Bay, Wisconsin, assigned material handling to this Model 75A Michigan Tractor Shovel.

"You might say the Michigan combined the mobility of a pickup truck with the traction of a crawler," explains one Company official. "It certainly eliminated the usual problems of unloading and moving building supplies: the slow expensive hand labor . . . the slowness and lack of mobility of crawler-loaders . . . the lack of capacity of easy-to-get-stuck farm-type tractors."

Saves 3 man-hours unloading blocks

In the two years since its purchase, Selmer has handed dozens of jobs over to the 1¼ yd 80 hp Michigan. Above is a common assignment—moving palletized concrete blocks from trucks to scaffolding. Unit lifts 68 blocks, weighing 3,800 lbs AT ONCE. These are stacked 10 ft high so laborers can skid blocks direct onto scaffolds. Entire job, including

stacking, takes two men 10 minutes. Unloading alone used to take five hand-laborers an hour. And an elevator had to be set up and used continually.

Saves \$15 to \$25 per brick truck

Similar savings are reported when brick is handled. It used to take four men using brick tongs three hours to unload a semi-trailer. Now, Selmer has the bricks palletized in 500-unit lots, 12 pallets to the semi . . . unloading takes the Michigan and two men 10 to 15 minutes. Smaller trucks carry 4 pallets, take 5 minutes to unload with the Michigan compared to 1½ hours with four hand laborers. Savings average \$15 to \$25 per truck *including* extra charges for palletizing!

Replaces expensive crane to unload marble

Unloading carloads of marble or cast stone always gave Selmer Company a costly headache too. Formerly, they

rented a crane. Recently, however, their veteran shop foreman, Norb Tilkens, designed and fabricated a special boom which attaches to the tilt bracket. With this, the Michigan reaches across a truck, lifts two or three slabs of marble from the railroad car, gently lowers each 700 lb load to the truck bed. In a few hours, the car is completely unloaded. Savings on a typical 15-car shipment run \$500 or more.



Eliminates ramps, pump set-up for concrete

Above is another home-made attachment . . . a concrete bucket which can be lifted on the Michigan forks. It carries four wheelbarrowfuls per load. Pour is made simply by tilting forks slightly forward so concrete flows out of 6" square spout into forms. Time and labor of barrow-men are saved. Nor does Selmer have to build ramps or, on small pours, set up a pump.

Handles wide variety of other materials

Lots of other materials have been handled from time to time. Some of them are:



Rip-rap — old brickbats and concrete dozed into river to protect building.

. . . for more details circle 222, page 16

ROADS AND STREETS, April, 1957



Lumber — as much as $\frac{3}{4}$ of a truck load (3500 to 4000 lbs) unloaded at once, stockpiled, later carried to hoist.



Rolls of reinforcing wire — carried on forks, stockpile to hoist. Fork spacing changed in seconds to fit roll openings.



Trash — cleaned from around building site.

One man changes bucket, forks

Some of these jobs, you'll note, call for fork lift, some for tractor shovel bucket. These two attachments (and others) are easily interchanged. It takes Selmer's operator, John DeMoulin, working alone, 10 minutes.

In two years, NO breakdowns

No matter what the job, Selmer Company can depend on their Michigan working a full day! "In two years . . . over 6,000 operating hours," recalls Shop Foreman Tilkens, "we've NEVER had the machine break down on the job. It has saved us over 50% in time and manpower!"

A Michigan could do as well for you!

Michigan is a registered trade-mark of

**CLARK®
EQUIPMENT**

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2497 Pipestone Road
Benton Harbor 28, Michigan
In Canada: Canadian Clark Ltd.,
St. Thomas, Ontario

...Announcing new profit

REPORT on new truck-crane standards:
(one in a series)



- ① Compare lifting capacities with boom at extended radii . . .
- ② not at minimum radius where little work is actually done

LINK-BELT SPEEDER Zephyrcranes feature greater capacities with long booms at extended radii



Truck-crane production is directly related to lifting capacity. But lifting capacity varies with boom length and radius.

Thus, it's important to measure capacity with the boom out 25 to 40 feet or more where most work is done. And on this basis, you'll be amazed to discover by how big a margin a Link-Belt Speeder outperforms other rigs.

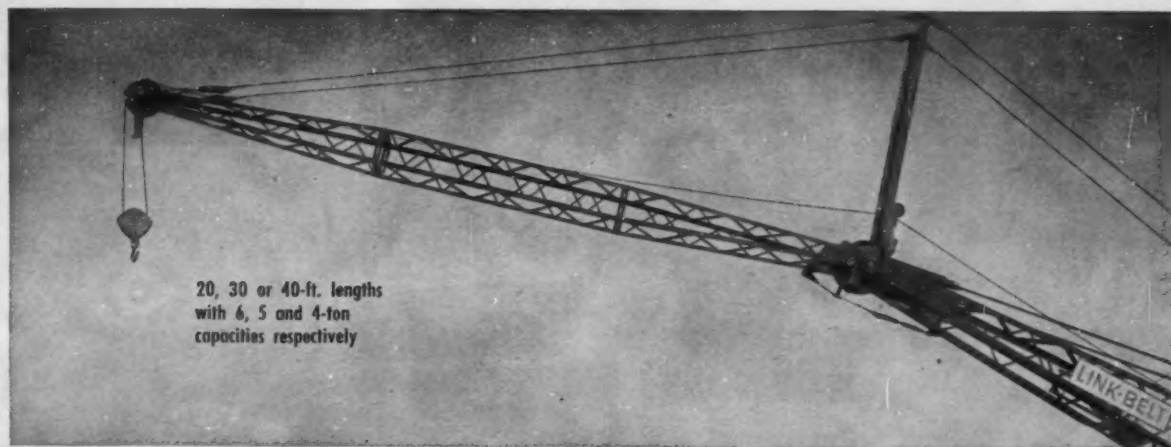
Why? Each Link-Belt Speeder Zephyrcrane (six models, 10 to 35-ton capacities) is years ahead in design. It's a machine with extra "live" weight, a machine with a strategically-located upper for better balance and stability. It has a new high strength alloy boom, new

high-capacity jib and scores of features such as the patented high retractable gantry.

What's more, every Link-Belt Speeder has Speed-o-Matic—the exclusive true power hydraulic control system. Fingertip-operated, Speed-o-Matic provides fast, positive, precise response . . . perfect feel of the load at all times.

But that's only part of the story. For complete details on how a Link-Belt Speeder can help you profit more, set new high standards of truck-crane performance and production—contact your Link-Belt Speeder distributor or write—Link-Belt Speeder Corporation, Cedar Rapids, Iowa.

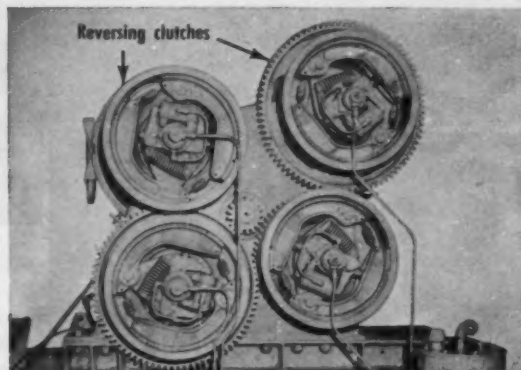
standard for truck-cranes



20, 30 or 40-ft. lengths
with 6, 5 and 4-ton
capacities respectively

NEW HIGH CAPACITY JIBS are all-welded, box latticed and built from lightweight but exceptionally strong alloy steels. Available for Link-Belt Speeder HC-88, HC-98 and HC-108 truck-crane models (25, 30 and 35-ton capacities)—the jibs are designed and furnished with jib

backstop cables. Turnbuckles are provided for length adjustments to meet a wide variation of jib to boom angles. The jib peak sheave and the jib strut deflector sheaves are mounted on anti-friction bearings. A ten foot jib strut is furnished for all jibs regardless of length.



LOAD LOWERING CLUTCHES

Speed-o-Matic hydraulic-actuated reversing clutches are available for either or both main drums. They provide power load lowering of main hoist line and jib whip line. Also, these clutches are self-compensating for heat and normal lining wear . . . seldom require downtime for hairline adjustment.

POWER-CONTROLLED BOOMHOIST

Another important Link-Belt Speeder feature is Independent Rapid Boomhoist which provides power raising and power-controlled lowering of the boom through large, two shoe boomhoist and boom lowering clutches. Clutches are same size and interchangeable with the main hoist and swing clutches.



NEW 4-AXLE CARRIER

This new, fast, highly stable carrier is available for HC-98 and HC-108 truck-crane. Prime factor behind its development was meeting state road restrictions . . . easing paperwork and minimizing delays in job-to-job travel. The carrier itself is fabricated from heavy, extra-strength alloy steels. Tandem rear wheels feature full-floating walking beam support which allows wheels to follow uneven terrain . . . maintain full traction at all times . . . increase stability.

14,000

It's time to compare . . . with

LINK-BELT SPEEDER

Builders of a complete line of shovel-crane . . . with exclusive Speed-o-Matic power hydraulic controls

. . . for more details circle 265, page 16

ROADS AND STREETS, April, 1957



Shovel-loading big-chunk rock into Dumptor — square body opening provides 64 square feet of target for easy loading over the side, or either end. It's the heavy-duty hauling unit with a ton of strength for every ton of payload capacity!



Plenty of power on the haul — (check high ratio of H.P.-to-loaded-weight in Dumptor story on next page). Dumptor also travels at same speeds in either direction for fast, no-turn shuttle hauling.



One-second gravity-dump speeds haul cycles. Dumptor has no troublesome body hoist, no hoist maintenance. Gravity-dump never balks, and never wears out.

IN ROCK LIKE THIS

you need Dumptors

When you are loading $1\frac{1}{2}$ to $2\frac{1}{2}$ yards of rock at a single pass, hauling units need plenty of strength to last. With Koehring heavy-duty Dumptor, there's a ton of strength for every ton of payload capacity. *It's built for rock.* Sides and ends of all-welded 6-yard body are heavily rib-reinforced. Double-plate bottom, lined with multiple steel beams, cushions the shocks of rock loading. Bolted or free-swinging kick-out pan adds another $\frac{1}{2}$ " steel plate to Dumptor bottom for extra strength.

There's plenty of strength, too, in the heavily-trussed chassis to take constant pounding of heavy loading and rough, off-road hauling. What's more, Dumptor has no leaf springs — just one big snubber-type chassis spring on the steering axle — none on the drive axle. Big drive tires eliminate the need for more springs, absorb loading and hauling shocks — save spring maintenance.

Even with all this heavy-duty strength, Koehring Dumptor® still has more than 6 H.P. for every ton of loaded weight. It accelerates fast, pulls through soft ground with less shifting, climbs 24% grades fully loaded. If you have a tough hauling problem, see your Koehring distributor about this heavy-duty 6-yard Dumptor. Why not call him now?

KOEHRING COMPANY

MILWAUKEE
16
WISCONSIN
C842



Subsidiaries:
JOHNSON
PARSONS
KWIK-MIX

... for more details circle 258, page 16

ROADS AND STREETS, April, 1957

Digs within 12 inches of side obstructions

Off-set digging boom on Parsons 250 Trenchliner® puts trench within 12 inches of curbs, poles, buildings — digs almost directly behind either crawler. Reversible conveyor shifts through machine by power in less than 1 minute, discharges right or left. 250 production capacity: $3\frac{1}{2}$ inches to 9 $\frac{3}{4}$ feet per minute. Widths: 16 to 42 inches. Depths to 12 $\frac{1}{2}$ feet. Four other Parsons Trenchliners are also available in all sizes and types.

PARSONS • Newton, Iowa
(Koehring Subsidiary)



Portable, easy-charging $3\frac{1}{2}$ -S Dandie® mixer

With this Kwik-Mix $\frac{1}{2}$ -bag concrete mixer, charging height is low, only 43 inches. Convenient end-discharge, easy tilting drum, and unobstructed spotting area speed loading into wheelbarrows. Push down tow-pole gives safe, 1-man handling on the job, is easily hitched for trailing. Other models: side-discharge tilter, end-discharge non-tilt. Other concrete mixer sizes up to 16-S. Also: plaster-mortar, bituminous mixers and Moto-Bugs®.

KWIK-MIX • Port Washington, Wis.
(Koehring Subsidiary)



254 to 1321-barrel bulk cement plants

Easy to ship, simple to erect and re-assemble at next site, Johnson silos are all-welded in one piece, 11 or 12 ft. diameter. Single silo capacities: 254 to 611 bbls. Has screw conveyor, bucket elevator, receiving hopper, one or two 1,000-lb. batchers. Larger batcher, extra leg and elevator height available for charging mix trucks. Second silo at ground level increases total plant storage capacity up to 1321 bbls. of cement.

C. S. JOHNSON • Champaign, Ill.
(Koehring Subsidiary)



WHAT'S NEW in Equipment and Materials

Radio Squelch System

General Electric Co. has announced a new tone squelch system designed to relieve two-way radio users of the necessity of listening to transmissions of other operators sharing the same channel. The new product is said to combine the advantages of both tone squelch and conventional noise squelch. It provides one-way or two-way protection against unwanted calls, noise and disruptive interference and enables two or more users in the same geographical area to share a channel without having to listen to messages other than their own, according to the company.

For more information circle 101 on Service Coupon this page and mail now.

Digital Computer

Low-cost digital computers now available to industry and government can help ease effects of the national engineer shortage by extending an engineer's ability to perform, says Maurice Horrell, general manager of the computer division of Bendix Aviation Corp. Horrell said he was speaking of computers priced around \$50,000, contrasted to large computers and custom-built, specialized data-processing systems priced from \$100,000 to \$3,000,000.

Bendix digital computers already are being applied to many complex applications, including oil surveys, highway earthwork computation, correlation of water levels in rivers and reservoirs, gear-shaping, navigation and optical design, he said.

Improved designs, simpler operating

techniques and factory training for the users have made general-purpose computers practical for almost any overloaded engineering team, said Horrell.

For more information circle 102 on Service Coupon this page and mail now.

Grading and Screening Plant

A portable gravel grading and screening plant has been announced by Pioneer Industries, Inc., 2700 Hawkeye Drive, Sioux City, Iowa. The plant, with controls said to be completely hydraulic, provides speeds from 0 to 1800 rpm, is claimed to be engineered for complete portability. The operator has a choice of screens and screening mechanism.

The plant has a 27-ft. wheelbase and is designed to meet all highway limitations, can be moved from job to job without removing any items, according to the manufacturer. Total weight is 23,000 lb.

For more information circle 103 on Service Coupon this page and mail now.

Asphalt Pressure Distributor

A new 1957 model 424-56 asphalt pressure distributor was exhibited at the road show by Standard Steel Works, Inc., North Kansas City, Mo. This pressure distributor represents a complete departure from the design originally produced by this company for many years. It incorporates the use of a special Viking asphalt pump built and designed especially for the distributor by Viking Pump Co.

For more information circle 104 on Service Coupon this page and mail now.

MM Series of Industrial Tractors

A completely new series of industrial tractors for highway and general construction as well as for varied industrial uses has been announced by Minneapolis-Moline Co., Box 1050, Minneapolis 1, Minn.

First of the new series now available is the new Model 445 industrial wheel-er powered by a 57 brake-horsepower engine. Major engineering advances include integral power steering; transmission with 10 speeds forward and two reverse; extra heavy industrial axles; large selection of hydraulic pumps; over-all heavy-duty construction of transmission and engine; 12-volt electrical system; and 3-point hitch for tools.

For more information circle 105 on Service Coupon this page and mail now.

More Equipment News Page 178

60 HP Diesel Engine

A new diesel now being marketed by Columbus Engine Co., Inc., Columbus, Ind., is a 60-hp, 4-cyl., 4-cycle unit with a piston displacement of 267 cu. in. The engine's crankshaft is high tensile strength steel forging with all bearing journals induction hardened. The detachable cylinder head is a single casting with stellite inserts on exhaust valve seats.

Pistons are aluminum, cam ground with knurled skirt for maximum cylinder wall lubrication. Intake and exhaust valves are of heat resisting alloy steel, 1½ in. in diameter. Weight of the engine with standard accessories is approximately 990 lb.

For more information circle 106 on Service Coupon this page and mail now.

3000 Watt Generator

A new 3000 watt generator featuring generous overload capacity and close voltage control has been introduced by Homelite division of Textron, Inc., Port Chester, N. Y.

The new generator is said by the company to start easily and operate without attention. No permanent installation is needed. A special feature of the unit is said to be its simple construction so as to reduce maintenance costs. It is constructed without DC brushes, commutators, DC windings or intermediate couplings. The model 41A115 is 3000 watt, 115 volt, 60 cycle single phase AC. The model 41A115/230 is 3000 watt, 115/230 volt, 60 cycle single phase AC.

For more information circle 107 on Service Coupon this page and mail now.

(Continued on page 178)

MAIL THIS COUPON TODAY!

ROADS & STREETS
22 West Maple Street
Chicago 10, Illinois

CIRCLE THE
NUMBER
AND MAIL NOW!

Please send me further information on products and materials mentioned in the April Roads & Streets as circled below

About New Equipment and Literature:										Further Information on Advertised Products:									
101	102	103	104	105	106	107	108	109	110	111	112	233	234	235	236	237	238	239	240
113	114	115	116	117	118	119	120	121	122	123	124	241	242	243	244	245	246	247	248
125	126	127	128	129	130	131	132	133	134	135	136	249	250	251	252	253	254	255	256
137	138	139	140	141	142	143	144	145	146	147	148	257	258	259	260	261	262	263	264
149	150	151	152	153	154	155	156	157	158	159	160	265	266	267	268	269	270	271	272
161	162	163	164	165	166	167	168	169	170	171	172	273	274	275	276	277	278	279	280
173	174	175	176	177	178	179	180	181	182	183	184	281	282	283	284	285	286	287	288
185	186	187	188	189	190	191	192	193	194	195	196	289	290	291	292	293	294	295	296
197	198	199	200	201	202	203	204	205	206	207	208	297	298	299	300	301	302	303	304
209	210	211	212	213	214	215	216	217	218	219	220	305	306	307	308	309	310	311	312
221	222	223	224	225	226	227	228	229	230	231	232	313	314	315	316	317	318	319	320
												321	322	323	324	325	326	327	328
												329	330	331	332	333	334	335	336
												337	338	339	340	341	342	343	344
												345	346	347	348	349	350	351	352
												353	354	355	356	357	358		

Name _____ Title _____
Firm or Gov't. Dept. _____
Street _____
City _____ State _____ 4-57

NOT GOOD AFTER MAY 15, 1957

A READER SERVICE FOR YOUR NEEDS



more power...

plus traction for every footing!

Sock a big loader bucket into a hard-packed pile! Feel the stepped-up power of the new International® 350 Utility tractor! See how a half-ton greater built-in weight knuckles in to give you traction for the big bites. See how big-diameter pneumatic tires provide full-load flotation . . . even on soft dirt or slick concrete.

Back out fully loaded! Let power steering help you turn sharp with a light touch of one hand. Your other hand is free to control the 1,500-pound loaded bucket high overhead. With power steering, you save time on every pass—cut costs every hour.

Tough going? Don't shift! Just pull the Torque Amplifier lever to boost pull or push-power up to 45%, *on-the-go*.

So try it! Call your IH dealer for a free demonstration on your job. Give him an opportunity to prove the International 350 Utility gives you extra power teamed with extra weight and stamina to outwork them all!



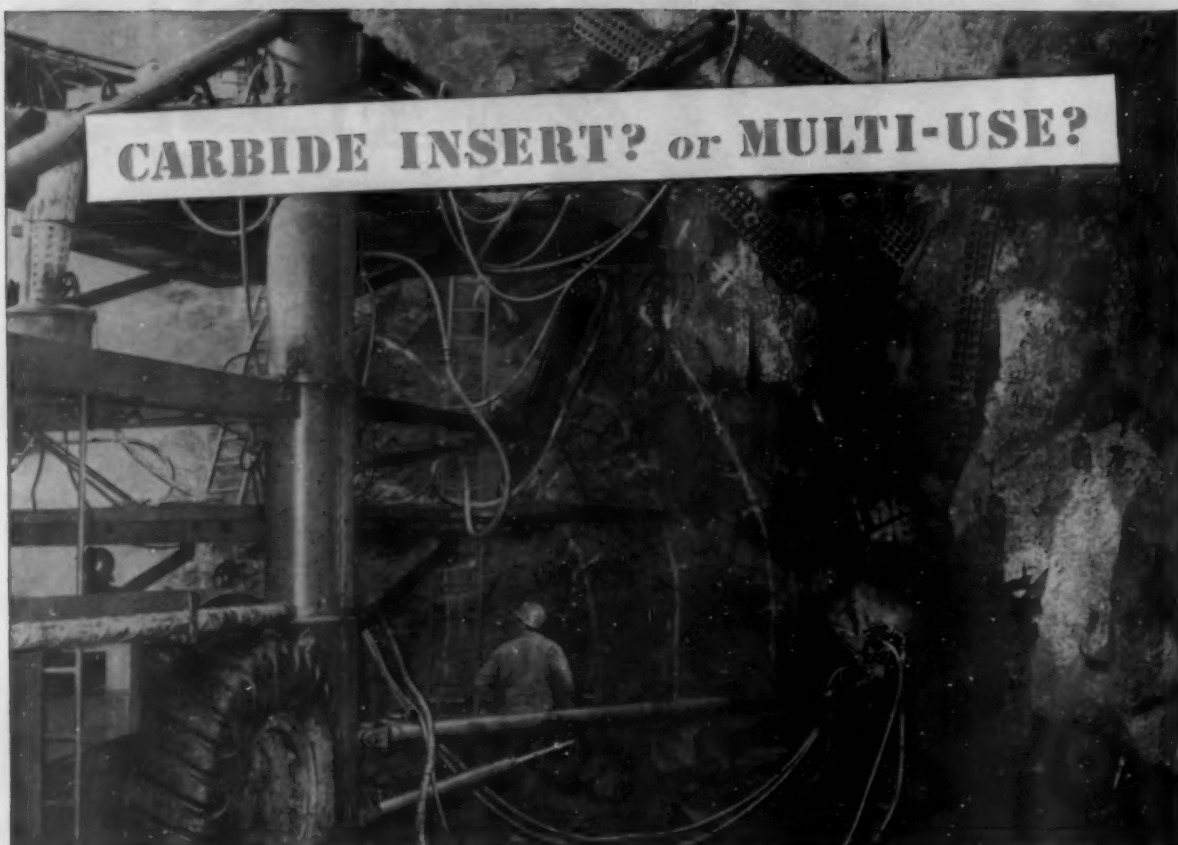
Faster trenching! You can feel the extra down-pressure from 350 Utility built-in weight to make tough digging faster.

SEE YOUR
IH INTERNATIONAL HARVESTER DEALER

International Harvester products pay for themselves in use—McCormick Farm Equipment, Farmall and International Tractors . . . Motor Trucks . . . Construction Equipment . . . General Office, Chicago 1, Illinois

. . . for more details circle 252, page 16

ROADS AND STREETS, April, 1957



LOCATION: Mayfield Dam site, near Saukum, Washington.

OPERATING CONDITIONS: Medium blocky basalt.

Increased drilling speed with TIMKEN® carbide insert bits saves time, labor on Mayfield Dam tunnel

DRILLING a diversion tunnel for the city of Tacoma's Mayfield Dam, Gibson and Roberts, rock drilling specialists of Yardley, Washington, had to chew through medium blocky basalt. For highest economy drilling through this hard ground, they used Timken® carbide insert rock bits with their jumbo drill rig.

Timken carbide insert rock bits permitted high speed drilling with fewest bit changes. With Timken bits the ground was drilled and blasted in one shift.

Under many tough drilling conditions, you can get top economy with Timken carbide bits. But carbide insert bits may not be best for every job.

In softer, less abrasive ground, Timken multi-use bits, correctly controlled and reconditioned, give you the lowest cost per foot-of-hole when you can drill out full increments of drill steel.

Whether your drillers use Timken multi-use or Timken carbide insert bits, they will save time because these bits are interchangeable in the same thread series. A wide range of different Timken bits fit the same drill steel. You can change bits right on the job, as fast as the ground changes. What's more, Timken rock bits are made from

our own electric furnace fine alloy steel. And they have a specially developed shoulder union that protects threads from drilling impact.

To find out which type of Timken rock bit will do the best job for you write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable: "TIMROSCO".



Timken threaded multi-use rock bit



Timken threaded carbide insert rock bit

your best bet
for the best bit
... for every job

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

... for more details circle 308, page 16
ROADS AND STREETS, April, 1957

ROADS AND STREETS

Sixty-Five Years of Editorial Leadership

Washington News Letter



By Duane L. Cronk

April 10, 1957

Highway construction costs will undoubtedly continue to rise, Lester C. Rogers, incoming president of the Associated General Contractors of America, predicted at the association's annual meeting in Washington last month. Mr. Rogers maintained it would be unrealistic, in the face of still rising material costs and general inflation, to expect bids to level off.

The AGC president added, however, that contractors' profit margins are becoming alarmingly thin as they seek to hold the construction price line.

A complete story on the AGC convention will be published in Roads and Streets next month. Here, meantime, are a few highlights:

- In spite of already heavy competition among the 6,000 firms bidding for road work, there should be even more contractors in the business. That was the opinion expressed by Bertram Tallamy, new federal highway administrator. "There will be ample opportunity for new contracting organizations to enter the field," he declared.

- Contractors should be paid full allowance for work accomplished on periodic estimates, and should be advanced funds where circumstances create over-runs during construction. The AGC contractors so urged in resolutions directed to the Bureau of Public Roads and the American Association of State Highway Officials.

Also, contractors feel, a specification clause should be adopted which would encourage a uniform policy in the payment for materials delivered for project work.

* * *

The battle of the billboards was the only major highway issue discussed in Congress last month. But because of its popular appeal to the motoring public, the debate made the headlines repeatedly. Leading the fight for prohibition of roadside advertising along the new Interstate routes were such national figures as U.S. Senator Richard Neuberger and Robert Moses of New York, supported by such powerful organizations as the American Automobile Association.

Their argument is that the new superhighways should be beautiful as well as utilitarian. These critics want Uncle Sam to ban billboards within a specified distance from the road. "Will these costly new thoroughfares run between corridors of garish and unsightly billboards, or will they offer vistas of scenic countryside? That is the fundamental question . . ." Senator Neuberger declared heatedly.

(continued on next page)

The opposition is insisting that a ban on billboard advertising would harm the thousands of small roadside businessmen who depend heavily upon business from the traveling public. Farmers, too, would suffer if their revenue from outdoor advertising (site leases) were cut off, they say.

A "compromise" measure has been offered by Secretary of Commerce Weeks. Mr. Weeks would not arbitrarily forbid highway advertising, but would cut federal aid for Interstate jobs from 90% of the cost to 85% in states which do not outlaw billboards. His policy would discourage such devices within 750 feet of the pavement. The BPR has predicted it would cost an average of \$6,000 a mile to acquire the 750-foot advertising easements. (Construction costs have been estimated at \$700,000 a mile. Thus a state would lose \$35,000 in federal aid if it declined to spend \$6,000 a mile for easements.)

* * *

A comprehensive study to determine who should pay for the new roads envisioned in the \$50-billion National Highway Program was kicked off in Washington last month. The Bureau of Public Roads has just issued a 50-page prospectus describing its plans for the highly controversial highway cost-allocation study. Congress last summer asked the Bureau to make a study of the following issues, as a basis for determining future user taxes:

- (1) The effects of design, construction, and maintenance of federal-aid highways of vehicles of different dimensions and weights, and the proportion of such vehicles in the traffic stream,
- (2) The proportionate share of the costs of the highways attributable to each class of highway users, such proportionate share to be based on the effects referred to above and the benefits derived from the use of such highways, and
- (3) Direct and indirect benefits of highways to non-users.

The effect of vehicles of various weights and dimensions on roads of various structure will not be known until after AASHO's Illinois Road Test is completed in 1959. However, BPR analysts are hoping that "significant preliminary findings" from that project will be available for the report.

Even tougher to determine will be how much each class of user benefits from its use of the highways. The Bureau must come up with some logical answers to this question. Fortunately, there has been more research in this area recently, as well as some revelation of how non-users and the general economy of the nation profit from highway system development.

All these diverse considerations will be woven into the Bureau's final analysis. Its first progress report is at the printers due to be released this month.

* * *

Secretary of the Treasury George Humphrey made his first report on the condition of the Highway Trust Fund to Congress last month. Both income and expenditures of the fund - set up by Congress last session to serve as the special pay-as-you-go account for the National Highway Program - are running higher than estimated. Receipts from highway user taxes totaled nearly \$784 million, compared to \$567 million in expenditures.

B.F. Goodrich

*job inspection tour with Bill,
your traveling B. F. Goodrich reporter*



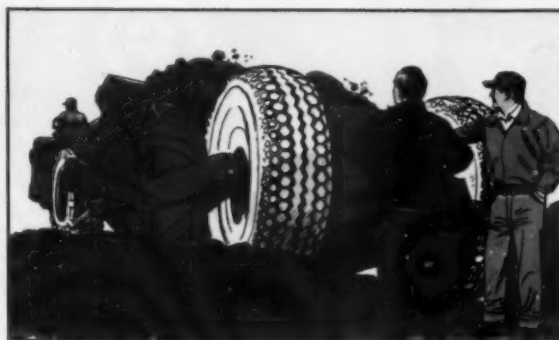
Building a turnpike



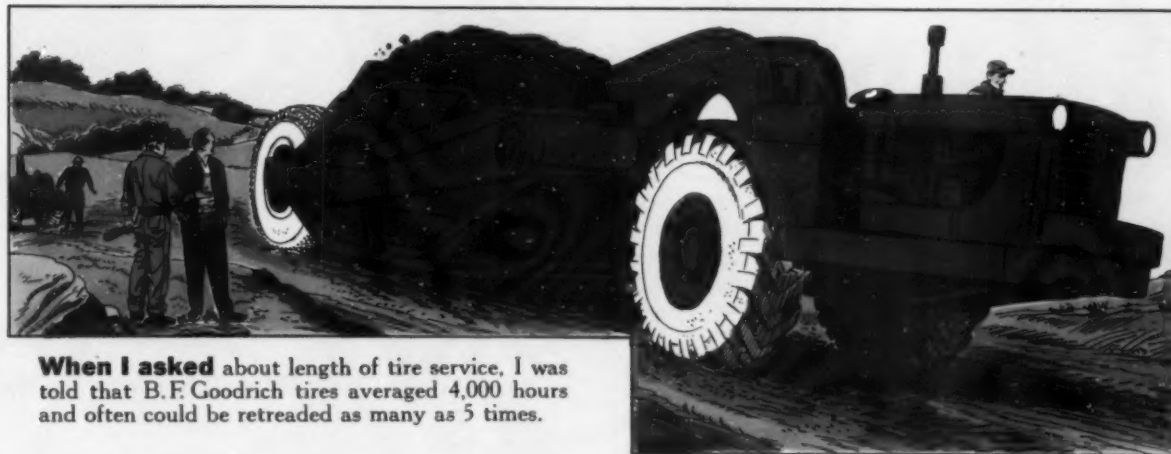
S. J. Groves & Sons Co. equipment was at work on the Indiana Turnpike near Howe the day I visited them. This world-wide contractor was using fleets of graders, scrapers, tractors, oil trucks and compactors 120 hours a week.




I found that sandy soil made the going tough for earth movers carrying 16-yard loads. But the company reported that B.F. Goodrich Super Traction tires were doing an exceptional job. Altogether, they said, they were using 7 different types of B. F. Goodrich tires.



B. F. Goodrich all-nylon tires have done a great job of reducing "down-time" to a minimum, and that means lower operating costs and increased efficiency, they reported.



When I asked about length of tire service, I was told that B.F. Goodrich tires averaged 4,000 hours and often could be retreaded as many as 5 times.

more 

Hauling stone



Jernigan Trucking Co. operates 17 trucks in and around Augusta, Georgia. In addition to stone, the trucks carry 8 to 20 tons of asphalt, top soil,

sand and gravel. Trucks work year 'round, says owner A. C. Jernigan, but busiest times are in the summer when temperatures go well over 100°.



Hauling stone over back-country roads for Little River bridge approaches was a problem for Jernigan. Giant loads of stone and rocky, rutted roads caused even new tires to blow out and fail within 30 days or less. After Jernigan switched to B.F. Goodrich *all-nylon* All-Purpose tires, they had no more blowouts. Competitors who did not switch continue to have trouble.



Many B.F. Goodrich *all-nylon* All-Purpose tires have gone over 50,000 miles—an all-time record on this operation.



"Tire cost is important, but we find the best tire is the cheapest in the long run," Office Manager H. B.

Leonard told me. "And we get every dollar's worth out of a B.F. Goodrich *all-nylon* All-Purpose tire."

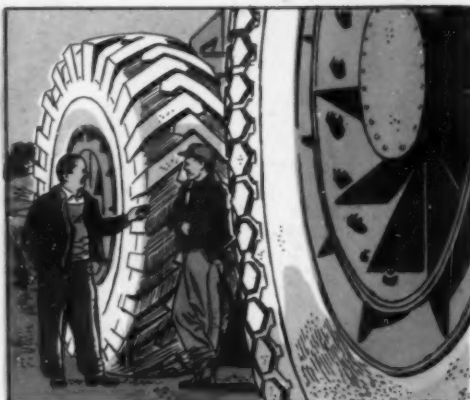
Earth moving



I found O'Connor Construction Co. tractors and 13-yard scrapers at work clearing a right-of-way in central Illinois. Tires carry a payload of over 22 tons, plus equipment weight.



O'Connor Construction Co. relies on B.F. Goodrich road service to keep its 110 all-nylon Super Traction and 40 Universal tires always ready for work. The tread designs are ideal for the job and give good all-around traction.



"Keeping on schedule is important on this earth-moving job," the general superintendent told me. "We're turning this old road into a 4-lane highway."



B.F. Goodrich tires work 3,000 hours on the original tread, the superintendent said, then are retreaded and give an additional 3,000 hours of service.

more →

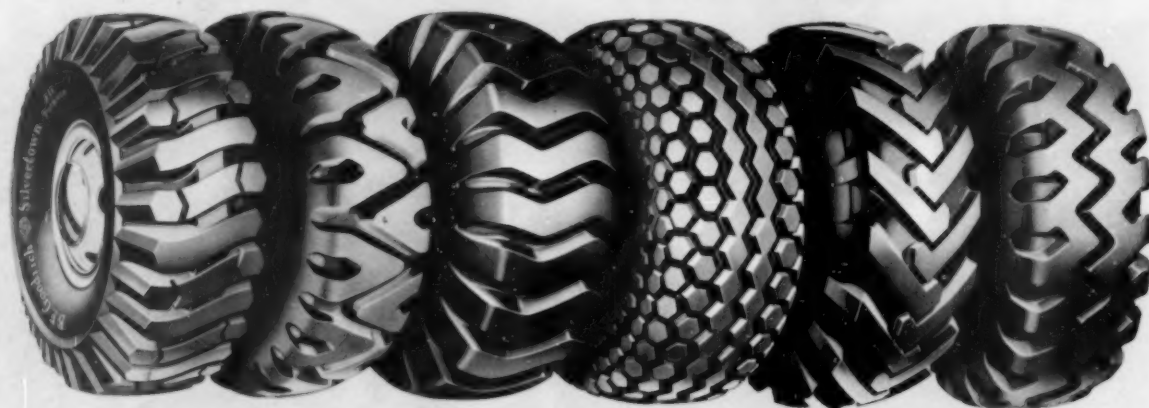


Whatever your job...
Wherever you work...
B.F. Goodrich

road service is
as close as your phone



THERE'S A B. F. GOODRICH TIRE FOR EVERY OFF-THE-ROAD JOB



All-Purpose tires work on paved or dirt roads or in the rough on such jobs as logging, sand and gravel hauling, excavating, etc. *All-nylon* or rayon construction. Sizes 6.00-16 through 12.00-24.

Universal tires are designed for power wheels on trucks and tractors that pull trailer equipment or for free-rolling wheels in severe service. *All-nylon* construction. Sizes 7.00-15 through 24.00-29.

Rock Service tires are designed for mining, quarrying and dirt-moving operations. Newest BFG tire. *All-nylon* cord body in tubeless or conventional construction. Sizes 12.00-24 to 33.5-33.

Earth Mover Traction tires are designed for free-rolling wheels on scrapers, earth-moving wagons and other pulled equipment. *All-nylon* construction. Sizes 14.00-20 to 24.00-29.

Super Traction tires work on drive or free-rolling wheels of dirt-moving rigs. *All-nylon* construction, sizes 18.00-23 to 24.00-29. **Tractor Grader** type, sizes 9.00-24 to 18.00-26.

Rock Logger tires are built for drive and front wheels on dump and logging trucks, cement mix trucks, quarry and construction machinery. *All-nylon* construction. Sizes 8.25-20 to 14.00-24.

Any one of the following B.F. Goodrich zone offices will arrange service

Phone the one nearest you

Atlanta, Ga. DR 8-4561	Denver, Colo. TA 5-1267	Memphis, Tenn. WH 8-6761	Phoenix, Ariz. AL 3-6168
Charlotte, N.C. ED 4-3066	Detroit, Mich. TY 5-8850	Minneapolis, Minn. FE 2-5474	Pittsburgh, Penna. HI 1-5200
Chicago, Ill. ES 8-8800	Houston, Texas CA 7-5228	Needham, Mass. NE 3-5815	St. Louis, Mo. PR 3-2600
Cincinnati, Ohio BR 1-7800	Jacksonville, Fla. EL 6-4167	New Orleans, La. CA 6341	Salt Lake City, Utah DA 2-2405
Cleveland, Ohio PR 1-0827	Kansas City, Kan. MA 1-4400	New York, N. Y. OR 9-0330	San Francisco, Calif. AT 2-9620
Dallas, Texas RI 1-5601	Los Angeles, Calif. RA 3-6111	Philadelphia, Penna. JE 5-5800	Portland, Oregon CA 3-3621

Free! Directory of B.F. Goodrich Truck Tire Distributors—nation-wide listing of the names, addresses and phone numbers of BFG distributors who offer road service—and B.F. Goodrich Truck Operators Handbook—facts and figures on BFG tires, load and inflation tables, maintenance tips, etc. Send for your FREE copies today!

B. F. Goodrich Tire Co.
A Division of The B. F. Goodrich Co.
500 S. Main Street, Akron 18, Ohio

Please send me a FREE copy of:

☐ Directory of B. F. Goodrich Truck Tire Distributors
☐ B. F. Goodrich Truck Operators Handbook

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

Specify B.F. Goodrich tires
when ordering new equipment



Your B. F. Goodrich dealer is
listed under Tires in the Yellow
Pages of your phone book

55% LESS KICK

with the NEW **LE ROI** shock-absorbing handle

The girl is
Virginia DeLee,
5' 8", 124 lbs.,
35-22-35

It's the hottest thing on rock drills yet! The new torsion rubber-cushioned handle on Le Roi sinks cuts out 55% of all vibration normally delivered by air tools to the worker . . . yet doesn't lose an ounce of impact at the bit!

That means a lot less fatigue—higher output per day—bigger smiles at the end of the shift. And workers stay on the job longer when work is eased with better tools.

You get dependability, too. Like all Le Roi Newmatic Tools, the shock-absorbing handle is built for years of service life.

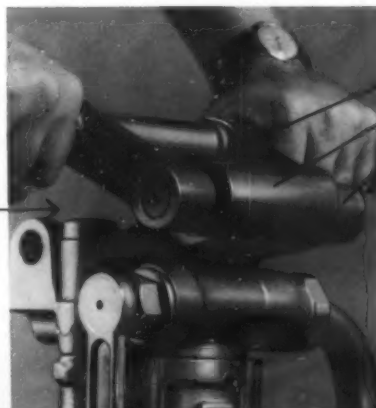
That's a lot of return for a low investment — see these new, new tools at your Le Roi distributor *now*. Le Roi Division, Westinghouse Air Brake Co., Milwaukee 1, Wisconsin



LE ROI NEWMATIC AIR TOOLS

a torsion rubber cushion in
the handle — adjustable to suit the operator —
dampens most vibrations.

55% of all tool-shock stops here!



Rubber grip handles
Torsion rubber cushion
Handle adjustment

...and you can wear
a wrist-watch, too!



Le Roi Model 6844
Wagon Drill for
deep drilling,
hard ground



Le Roi Model DM24
with H10 Drill for
shallow drilling in
average ground (also
with H23 Drill for
medium drilling in
hard ground)



Le Roi Model H111
Heavy-duty Sinkers
for deep drilling,
hard ground (55 lb.)



Le Roi Model H19
General purpose
sinker for average
ground (45 lb.)



Le Roi Model H186
Sinkers for shallow
drilling (35 lb.)

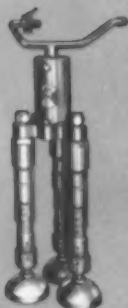


Le Roi Model 22
Sinkers for utility
work (17 lb.)



**Le Roi Air Operated
Sump Pump** —
capacities to 340
gpm, heads to 70 ft.

Le Roi Model H111
Triple Hand
Tamper for all
applications



Le Roi Model T1
Single Hand
Tamper for all
applications



Le Roi Model C18
Demolition,
light-duty Paving
Breaker (35 lb.)



Le Roi Model 31
Clay Spade for
average ground
(18 lb.)



Le Roi Model C18D
Clay Spade for
hard ground (35 lb.)



Le Roi Model C11
General-purpose
Paving Breaker
(60 lb.)



Le Roi Model 52
Heavy-duty Paving
Breaker for tough
concrete (80 lb.)



BE EMPHATIC... SAY LE ROI NEWMATIC!



A complete line of air tools for the
construction industry...balanced for
operator comfort...air-cushioned
for long life...precision built for
dependable operation.



Le Roi Division, Westinghouse Air Brake Co.
Milwaukee 1, Wisconsin

here's the backbone of the highway...

CLINTON WELDED WIRE FABRIC

Embedded in the concrete pavement, in the base course or in the asphaltic concrete surface, Clinton Welded Wire Fabric is the steel reinforcement that literally holds the highway together. The heavy, welded wires give positive mechanical anchorage of the concrete which means better load distribution and controls cracking.

Clinton Welded Wire Fabric is available in a wide variety of gauges and spacings for all reinforcing requirements. It meets all A.S.T.M. and A.A.S.H.O. specifications.



THE COLORADO FUEL AND IRON CORPORATION, DENVER AND OAKLAND

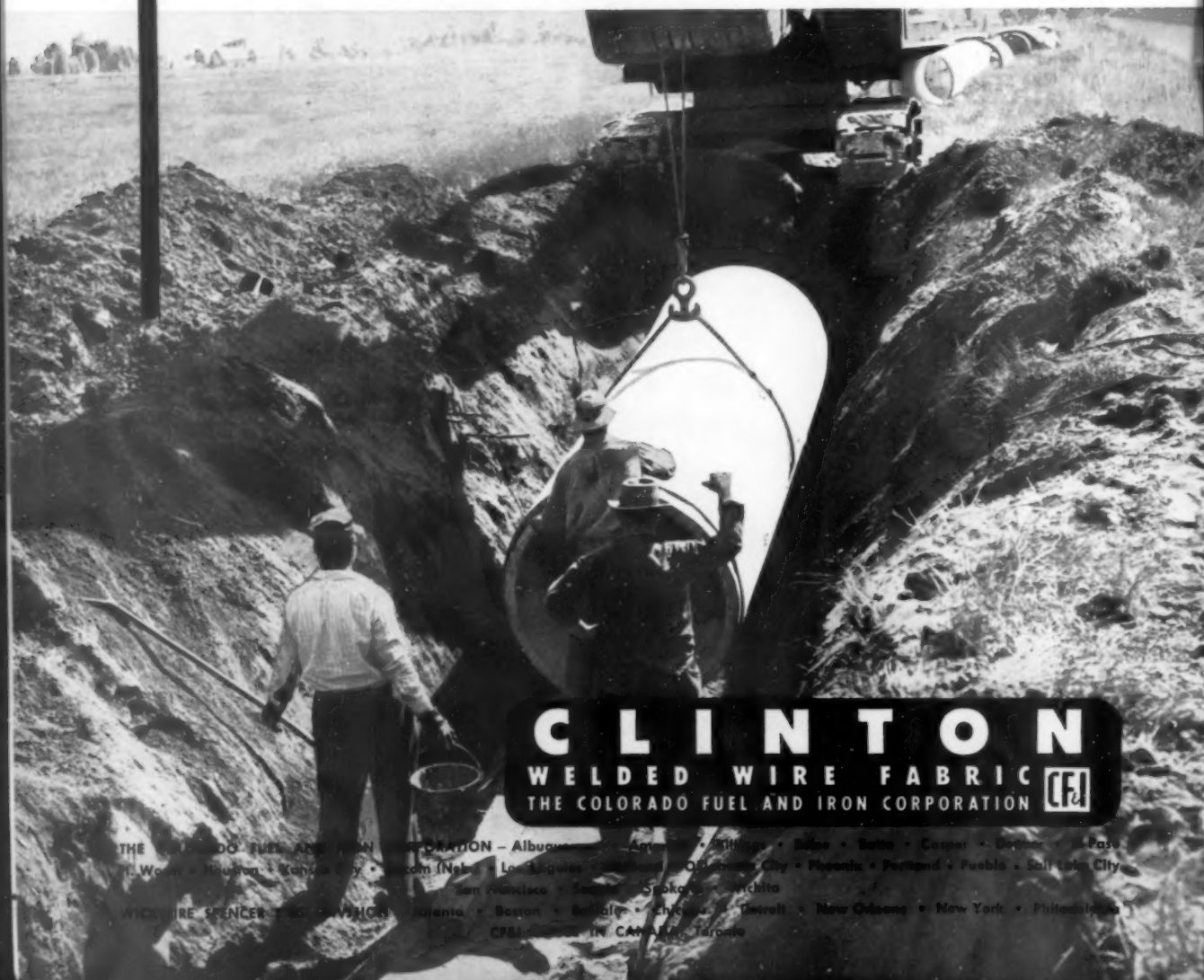
WICKWIRE SPENCER STEEL DIVISION, NEW YORK

here's the backbone of concrete pipe..

CLINTON WELDED WIRE FABRIC

Concrete pipe reinforced with welded wire fabric has the structural strength and freedom from corrosion necessary for maintenance-free pipe systems. Whether for new construction or for repair, when you specify concrete pipe reinforced with Clinton Welded Wire Fabric, you have assurance of a well-built job and a minimum of expense in the future.

Clinton Welded Wire Fabric meets all A.S.T.M. specifications and is available in the complete range of gauges and mesh sizes.



CLINTON
WELDED WIRE FABRIC 
THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION - Albuquerque • Arapahoe • Billings • Boise • Butte • Casper • Denver • El Paso
Fort Worth • Houston • Kansas City • Lincoln (Nebr.) • Los Angeles • Miami • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City
San Francisco • Seattle • Spokane • Wichita
WICKS WIRE SPENCER TUBE DIVISION - Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia
CFI DIVISION IN CANADA: Toronto

Headlines

How Big Have the State Highway Programs Become?

Official statistics just revealed by the Bureau of Public Roads show the following gleanings for the 1956 calendar year.

- \$2,761,503,000 in projects were awarded to contract or initiated under force account operations, totalling 56,527 miles. This represents an actual set-back, if not "treading water," since comparable figures for the 1955 calendar were \$2,610,484,000 for 58,034 miles of projects.

- A total of 15,764 contracts were awarded during the 1956 calendar year, compared with 15,380 jobs the year before. These and the above figures represent state jobs financed with and without federal aid and include toll projects.

- Federal aid figured in 64% of this work, 23% was done with state funds, only 13% toll road funds.

- Of the 100% state-financed jobs, \$36,769,000 representing 1.3% of the state programs was done by

(Continued on page 34)

Our Cover Scene This Month

The cover scene shows one of three trains of portable crushing and screening units as set up during 1956 by B. L. Anderson, Inc. for a 1,640,000-ton job for the Kansas Turnpike.

The detailed story which ran in *Roads and Streets*, September, 1956, described what is here pictured, namely the use of paired $\frac{3}{4}$ -yd. shovels for each production train. The small-sized shovels, besides being fast on the swing, also permitted flexibility of operation, a key requirement in the job of planning since the limestone pit was expected to vary constantly in character as the ledge moved back.

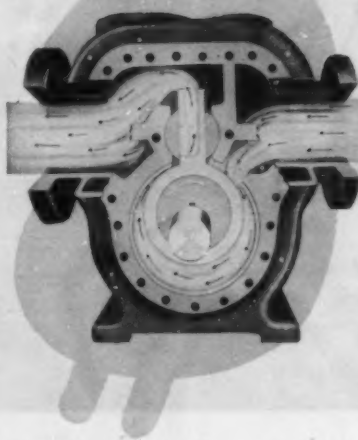
The shovel pictured is a Bucyrus-Erie 22-B (a companion Lima $\frac{3}{4}$ -yd. beyond camera range at left). The aggregate train here included a Cedarapids impact breaker with apron feeder, secondary hammermill with screen, and 25-yard portable loading bin. The engines are GM Detroit Diesel 671's.

**IF YOU CAN AFFORD TO GAMBLE,
HAVE YOUR FUN IN LAS VEGAS—**



BUT... Gambling on an Asphalt Pump is Just Too Risky!

Take a KINNEY steam jacketed Pump. On the record, it will outlast any other pump in asphalt service. While low depreciation is interesting... the BIG, vitally important advantage in a KINNEY Pump is—**FREEDOM FROM DOWN-TIME!** It can cost you thousands to have your pump "conk" out at the wrong time... and chances are, that's the time a "price" pump will choose to fail. That's why, in asphalt service, the odds are in your favor with a



KINNEY Rotary Piston Pumps are original equipment as a metering pump on leading asphalt mixing machines. Plain and steam jacketed KINNEY Pumps are available in the standard SD Model with capacities to 500 GPM.

Kinney®

ROTARY PISTON PUMP

The KINNEY Pump consistently outperforms other pumps—handling tars and asphalt at least 20° cooler. Consider the time you save getting viscous asphalt up to pumping temperature. Think of the fuel you save over the course of the year. These savings, over the years, can add up to many times the amount you think you're winning with a "price" pump. But the big, vital point is—the savings in down-time... and the peace of mind you enjoy with a KINNEY Asphalt Pump on the job!

KINNEY MFG. DIVISION
THE NEW YORK AIR BRAKE COMPANY

3337D WASHINGTON STREET • BOSTON 30 • MASS.



WRITE

for Bulletin L-51-A fully describing KINNEY Rotary Piston and the famous Heliquad Gear Pumps.

Please send me Bulletin L-51-A containing full information on KINNEY Rotary Piston Pumps.

Name

Company

Address

City Zone State

... for more details circle 257, page 16



Work Bulls pay off

on every construction project



Work Bulls provide the right tractor power with design-integrated attachments to build profit on these and scores of other jobs!

42 hp

DAVIS PIT BULL

(far left) is equipped with hydraulically controlled $\frac{3}{4}$ -yd. loader. Broom, blades, swinging crane or fork lift can be mounted on same loader frame and arms. The Pit Bull features a torque converter and combination foot feed and reversing clutches as standard equipment.

34 hp

WORK BULL MODEL 202

(center) with rear-mounted post hole digger that digs perpendicular holes even when working on slopes. PTO driven, the attachment can be used with either 8 or 12" augers. Other rear-mounted attachments include the Model 185 backhoe, reel and rotary mowers, multi-purpose blade and a pipe and cable layer. Front-mounted attachments include loader, blades, broom and fork lift.

52 hp

WORK BULL MODEL 404

(left foreground) is biggest, most powerful tractor in line. Available with gasoline or diesel engines it has five forward speeds and optional power steering. Model illustrated is equipped with low, direct-thrust $\frac{3}{4}$ -yd. loader and a fingertip-operated hydraulic backhoe which handles 12 to 36-in. buckets, digs to depth of $12\frac{1}{2}$ feet.

...as primary equipment

Work Bulls put former hand work on a paying power basis. With five tractors (34 to 52 hp)—choice of 20 *switch-in-a-smoke-break* attachments—Work Bulls pay off on small, scattered work-and-run jobs... earn their keep off-season, too, removing snow or handling other similar jobs.

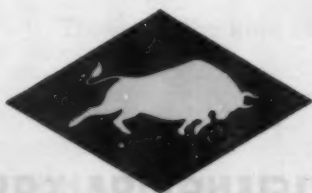
...as backup machines

With Work Bulls you get the exact power/equipment cost ratio the job demands... increase equipment scheduling efficiency... cut down overhead. Work Bulls move from site to site through city traffic or cross-country... without permit troubles, without flatbed and other costs.

...as utility or cleanup tools

When you're using shovels to clean up spill in the loading area, scrapers to smooth out haulroads, crawler dozers to pull wagons or skid light and medium-weight machinery—there's a profitable place for Work Bulls on your job. In fact Work Bulls help make your "big stuff" more profitable.

Work Bulls have a profitable place on every project. Check to see which of the 5 tractors (34 to 52 hp) and 20 easily interchangeable attachments you need. Write for free 24-pg. catalog and the name of your Work Bull distributor.



M·H·F WORK BULLS

Division of Massey-Harris-Ferguson, Inc.

19-D Quality Avenue

Racine, Wisconsin

... for more details circle 275, page 16

ROADS AND STREETS, April, 1957



FRUEHAUF TRAILERS

"ENGINEERED TRANSPORTATION"

World's Largest Builder of Truck-Trailers

FRUEHAUF TRAILER COMPANY

10958 Harper Avenue • Detroit 32, Michigan

✓ PLEASE SEND THE FREE LITERATURE ON
FRUEHAUF CONSTRUCTION TRAILERS AT ONCE!

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

☆ Fill in or just attach to letterhead and mail.

THE EFFICIENCY OF YOUR

ROADS AND STREETS, April, 1957



COST "CUTTERS"

Claims of efficiency mean nothing unless backed up by actual cases. The Fruehauf roadbuilding Trailers shown here are saving real money for their owners! Here are the *facts* in black and white.

Elmer Burger, driver-owner hauling sand and gravel for contractor Walter Morrell, Redford, Michigan, has cut equipment costs by hauling 40,000 pounds of payload per trip in one Fruehauf Cable Dump Semi-Trailer — previously a load requiring a combination dump truck and 4-wheel Trailer.

The Geo. F. Alger Co., Detroit, has speeded up cement delivery to a matter of 27 minutes for 170 barrels, and reduced manpower needed from 4 to 1, with Fruehauf Twin-Screw Bulk Commodity Tanks.

The Elmer C. Breuer Company of Cleveland hauls steel — one of the toughest kinds of loads — at the rate of a million tons per year, on Fruehauf Platform Trailers — and finds they operate longer for less, especially in the vital matter of tandem tire mileage.

These are the kind of savings *you* can put in *your* pocket.

FRUEHAUF FLEET IS PART OF YOUR ROADBUILDING PROFIT!

... for more details circle 328, page 16

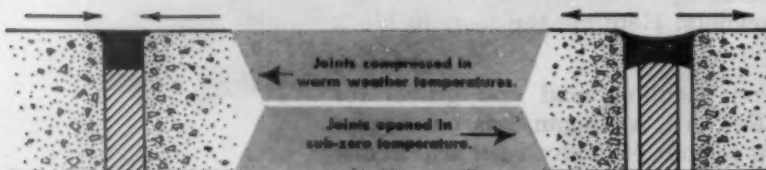
ROADS AND STREETS, April, 1957

Special Joint Sealing Compounds resist damage caused by Aircraft Fuel Spillage



keeps joints in airport concrete safely sealed under all conditions

The deteriorating effect of aircraft fuel and other petroleum solvents which come in contact with ordinary joint sealing material used on concrete runways, aprons and taxi strips, causes serious pavement damage and expensive maintenance. Once the seal of an expansion, contraction or dummy joint is broken the infiltration of water and foreign materials into the joint begins the damaging action which results in ultimate pavement failure.



The development of two special sealing materials—Hot Poured Para-Plastic® JF and Cold Applied Zero-Lastic® JF—which are impervious to petroleum solvents and are unaffected by extremes of temperature, has eliminated the damage caused by spillage of jet fuel and other petroleum solvents.

Both materials form a resilient and adhesive seal which maintains bond with the concrete at sub-zero temperatures. Their stability is constant and they will not become soft and fluid during high summer temperatures. (See drawings above.)

Hot Poured, Para-Plastic JF and the cold applied Zero-Lastic JF are widely used, not only in new construction, but in maintenance of old concrete pavement as well. Both compounds can be pumped into the joint with readily available equipment. Hot Poured Para-Plastic JF meets Federal Spec. SS-S-167, and Cold Applied Zero-Lastic meets Federal Spec. SS-S-170.

For more details on Hot Poured Para-Plastic JF and Cold Applied Zero-Lastic JF, write the manufacturer:

SERVICISED PRODUCTS CORPORATION • 6051 West 65th Street • Chicago 38, Illinois

... for more details circle 288, page 16

Headlines

(Continued from page 29)

force account. Most of this (\$23.7 million) occurred in Pennsylvania. Eight other states, however, constructed \$500,000 or more each of such jobs during the year.

- Force account construction where federal aid was involved was near the vanishing point, constituting less than 1/10 of 1% of the total road program—indicating the healthy influence of the laws and policies emanating from Washington in behalf of private enterprise.

Noteworthy in this report, at this time when there is a great push to expand the highway program, is the fact that the 1956 calendar year's road building effort by the state highway departments is almost exactly identical, statistically with that of the year previous. Some observers credit this to the fact that the states, in anticipation of the passage of the new Federal act, liberalizing the federal aid ratio, held off many important projects.

The dwindling pace of toll road, bridge and tunnel construction is indicated by the fact that the states reported a total of \$336,644,000 in jobs awarded during 1955 covering 345 miles, compared to \$724,144,000 covering 875 miles the year previous.

Huge Road Program for N. Y.

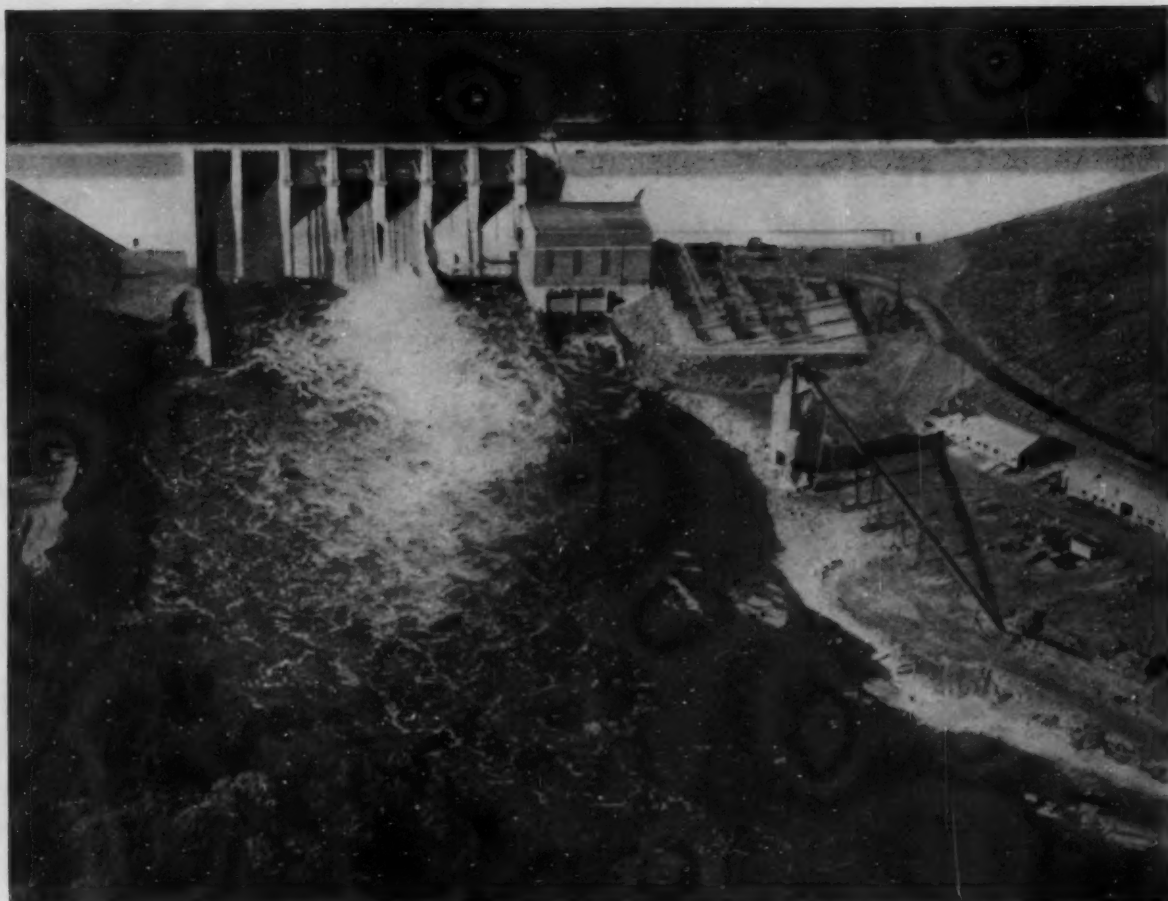
The largest long range state highway program ever outlined has been advocated for New York state and New York City by the Temporary Highway Finance Commission at Albany. An outlay of \$903,400,000 in state and federal funds is said to be needed over a twelve year period for New York City's highway and expressway system alone.

The total program for the state including the metropolitan area comes to \$4,536,800,000 in state and federal funds for the same period.

To make this program possible, the commission urged that the state gasoline tax be raised 1 cent and the diesel fuel tax 1½ cents a gallon, effective January 1958. The state and federal government would share about equally in the total cost of the 12-year job.

The state, besides making direct expenditures, would increase its

(Continued on page 36)



New England Hydro-electric Power Plant and Dam

Make your concrete more durable and exposure-resistant with AEROLITH air-entraining agent

Aerolith is ready for use at the ready-mix plant or at the construction site.

Over two hundred thousand cubic yards of concrete were used to build this New England hydro-electric power plant and dam. Every yard contained Aerolith—a chemically stable and rigidly controlled air-entraining agent.

These are the advantages of using Aerolith:

- concrete is more resistant to drastic temperature changes, is protected

against frost damage.

- improves workability, mixing, placing.
- minimizes segregation, honeycombing.
- increases wetting ability of water permitting reduction in water-cement ratio for a given slump.
- reduces bleeding; speeds finishing.
- increases resistance to water absorption and corrosive effects of salts, sea and mineral-water.
- Aerolith is compatible with other ad-

mixtures.

GOVERNMENT TESTED. Aerolith has been tested and approved by the U. S. Bureau of Reclamation and many State Highway Commissions. Since 1948 it has been used on numerous projects in the U.S.A. and abroad (names on request). In these projects long-term durability and resistance to disruptive effects of freeze-thaw cycles were specified.

Filling in the coupon will bring interesting technical data about AEROLITH.

AEROLITH

A Product of **Sonneborn** RESEARCH

Since 1903 manufacturers of quality building products



L. SONNEBORN SONS, INC.
Building Products Division—Dept. R-4
404 Fourth Ave., New York 16, N. Y.

Gentlemen:

- ☐ Send more information on AEROLITH air-entraining agent.
- ☐ Also include FREE copy of 128 page Building Construction and Maintenance Handbook.

NAME

COMPANY

ADDRESS

CITY ZONE STATE

... for more details circle 293, page 16

ROADS AND STREETS, April, 1957

MF THE ALL NEW WILLIAMS DIGGER

- NEW HEAVY-DUTY TRANSMISSION
- TWO-SPEED POWER CROWD
- ANTI-FRICTION BEARINGS ON ALL SHAFTS

The Williams MF Foundation Digger incorporates, on a small scale, all of the "tried and proven" design features which have made the LDH the perennial favorite of drilling contractors everywhere.



LDH FOUNDATION DIGGER

The Williams LDH Foundation Digger has broken all records for performance, dependability, durability and economy. For fast, efficient drilling of large-diameter holes up to 55 feet deep the LDH is without equal.

Distributed by
JOSLYN MFG. & SUPPLY CO.
Offices in Principal Cities



**HUGH B. WILLIAMS
MANUFACTURING CO.**

8330 Lovett Ave. • Dallas, Texas
Phone EVERgreen 1-2118

Headlines

(Continued from page 34)

contribution for county highway construction by an amount equal to 15% of the collections from an increase in motor fuel taxes, under the commission's recommendations. The commission also urged that the governor and legislature consider a constitutional amendment to earmark all revenues from increases in motor fuel taxes for highway purposes.

Interstate Routes Planned

The additional 1000 miles of interstate system highway routes authorized by the federal-aid Highway Act of 1956 were expected to be selected and designated by the Department of Commerce by late April.

This will bring to 41,000 miles the total length of routes included in this system which will be the recipient of the huge funds voted for the 13-year period, with 90% of construction costs from federal funds.

Training Course for Civil and Road Technicians

Believed to be the first educational course of its kind is one offered by Wentworth Institute of Boston, Mass., for training of civil and highway construction technicians in New England. Andrew Canzanelli, a graduate of the Institute, will be in charge of the course.

The course was inaugurated as the result of a survey conducted by Wentworth covering contractor members of the New England Road Builders Assn., and commissioners of public works in the New England states, as well as officials in leading cities in a six-state region.

The course will consist of a two-year program in civil and highway construction, leading to an associate engineering degree. Graduates will be prepared to enter career positions with engineering firms, public utilities, port authorities, municipal, state and federal engineering departments.

The curriculum will balance between theory and practical application, covering both office and field work. Subjects include surveying, culvert and abutment construction,

(Continued on page 46)

... for more details circle 316, page 16

Facts
you can really
get your teeth
into



Roebling Bulletin PC-932 is designed to show what is being done and can be done with prestressed concrete members.

One section is devoted to the details and operation of casting beds. Another section gives engineering data for tensioning strands.

Rather than tell you *all* about it, we would prefer to send you a copy. You can use the coupon or write to Construction Materials Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation



... for more details circle 285, page 16

ROADS AND STREETS, April, 1957

Construction Materials Division
John A. Roebling's Sons Corporation
Trenton 2, New Jersey

Please send me the new Roebling Prestressed
Concrete Booklet PC-932.

Name _____

Company _____

Street _____

City _____

Zone _____ State _____

This 9-yd. "hustler" in your fleet...

will



**Working alone...or slugging
it out with your production
fleet...this improved
Model D Tournapull® earns
extra profits on any size job**



Time a "D": It loads usually in less than a minute... hauls often in 4th gear at 20 mph... spreads on the run in about 15 seconds! This "hustle" means production... and production to you is money in the bank.

boost production - cut costs - increase your bank balance

When preparing to move-in on a project, there usually are many odd jobs to do before your big production earthmovers can begin to pay off. These preliminaries may include the building of access roads, detours, drainage ditches, a few cut-and-fill excavations, and other small-yardage assignments. You can do this work with bulldozer, grader, crawler-scrapers or big production scraper... but why triple your cost when one hustling 9-yard D Tournapull can do it for you at a big saving in time, manpower, and money?

You make your biggest profit with D Tournapull on odd jobs where it doesn't pay to use 18 to 27-yard scrapers. Use the 9-yard "D" on such jobs as cutting drainage ditches to dry out soft spots... for filling-in and shaping shoulders... stripping sod and hauling black dirt... leveling grade... filling washouts... building detours... and doing clean-up after the big production show is over, and your fleet is moved to a new location.

And when your fleet moves in for volume earthmoving, your 9-yard D Tournapull can take its place profitably

in production cycles. Figured on an ownership-operating cost basis, you'll find the "D" a sound investment on every work application.

Why is D Tournapull your best bet for these do-it-all assignments? The answer to this question was written years ago when LeTourneau-Westinghouse pioneered rubber-tired earthmovers. L-W engineers learned from experience in the field that pioneer and clean-up work was costly when handled by big machines. To correct this situation, the "D" size Tournapull was designed and engineered as a multi-purpose tool to fill this specific need. Since its introduction, some 8 years ago, the "D" has been continually improved. Today, this machine is generally accepted all over the world as the fastest, most maneuverable, and most profitable "handyman" dirt-mover tool in any production fleet, large or small.

There's a bonus in "D's" versatility. Put it to work building driveways or highways... it is small enough to work efficiently in tight spots; big enough to turn out profitable production on long hauls, or in pusher fleets.

turn page for more on D 'Pull



9-yd. "hustler" (continued)

D Tournapull[®]

boost production

Gets the work done . . .
whether going is hard or soft

No need to by-pass mud, muck, sand, or other tough going that bogs down ordinary rigs. D Tournapull, with its exclusive power-transfer differential, automatically transfers power to the wheel having firmest footing, and pulls on through for uninterrupted production and profit.

Wheel spinning — and its resulting tire wear — is minimized, and the duck-walking of independent manual wheel-braking is eliminated.

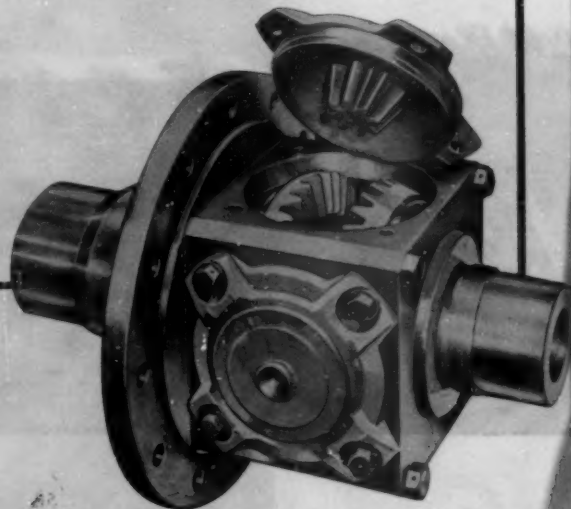
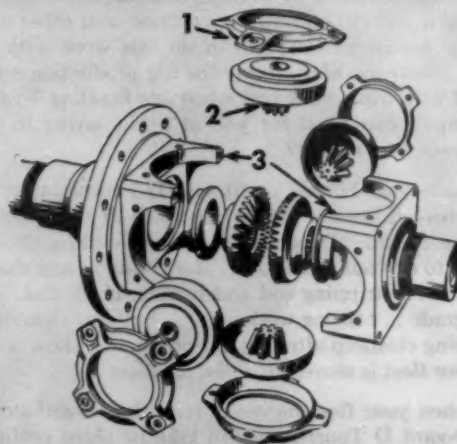
You have steady working speeds, in all working conditions, with the hustling, hard-working "D".

How this exclusive differential cuts costs — boosts production

Look at the photo of this exclusive, patented LeTourneau-Westinghouse power-transfer differential. Then look at the component drawing which shows the parts "exploded" for close examination. Here's how it works:

When one wheel starts to slip, a pinion (2) rotates within the housing (3) and is forced out against the large friction bushing (1). This restricts the speed of pinion rotation. As speed of rotation is reduced, a proportion of the applied engine power is automatically diverted to the opposite drive-axle. The greater the wheel slippage, the greater the restriction, and the greater the portion of power transferred to the wheel on firmest footing.

Power transfer is effected gradually. The opposing wheel-spin caused by sudden independent manual wheel-braking is eliminated. You go through soft, spongy spots with smooth, even power application. You eliminate needless delays, reduce costly downtime, get steady production and put bigger earnings in the bank!

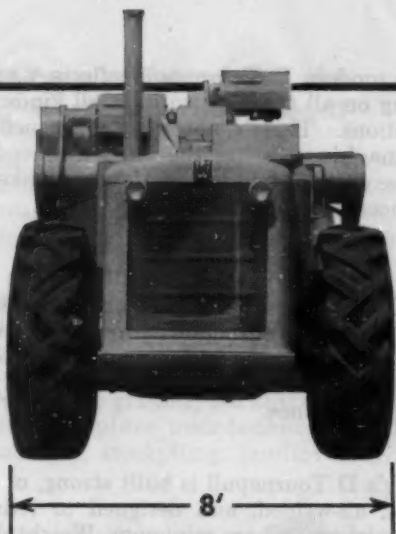




advantages

- cut costs

Study these advanced design features of D Tournapull... the result of a policy of continuous improvement for all LeTourneau-Westinghouse machines. These advantages add up to *more work done, at lowest cost... less downtime, bigger profits for owners.*

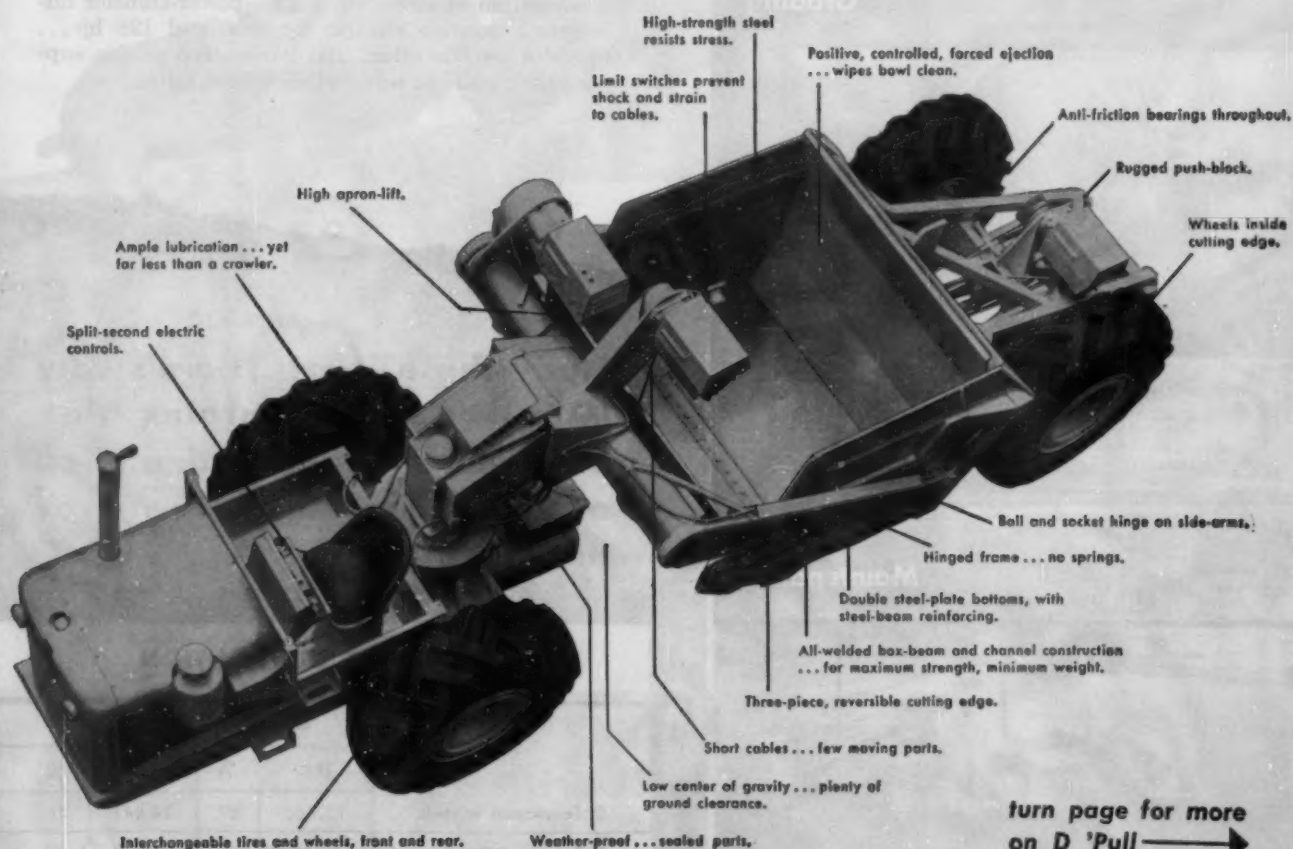


Improved design permits roading without permit

The D Tournapull-Scraper is now only 8 feet wide... with axle-load under 9 tons... to meet legal width and weight limitations.

You can road this machine without permit... maneuver it easily through crowded traffic, over narrow bridges... go anywhere, under its own power, at speeds to 29.5 mph.

Compare the "D" with any other tool of comparable size and capacity! Watch it work... and you'll see why this machine belongs on your earthmoving team.



turn page for more
on D 'Pull →

9-yd. "hustler" (continued)



Ditching



Backfilling



Grading



Clean-up



Maintenance



Production

Balanced design and the ability to work

The modern D Tournapull reflects years of tough testing on all types of work, in all kinds of working conditions. There's nothing "experimental" about this machine. It has the built-in speed, capacity, and easy loading characteristics that make it a profit-producer anywhere, any time.

More "D's" are in operation all over the world than all other scrapers in its size and price class. And the demand for D Tournapulls grows stronger year after year, proving conclusively that this machine justifies its leadership through low-cost operation and profitable performance.

Today's D Tournapull is built strong, of strong materials, all-welded, and designed to reduce useless deadweight to a bare minimum. Weight distribution concentrates the unit's load on big drive-wheels and big tires of maximum traction and flotation. The combination of balanced weight, power-transfer differential, positive electric controls, and 138 hp... provides tractive effort that levels steep grades, supplies the "pull" to work where others falter.

Study these charts. Here's why D Tournapull maintains high efficiency in mud, sand, and on adverse grades... wherever the going is tough.

WEIGHT DISTRIBUTION

	Empty		Loaded	
	lbs.	%	lbs.	%
D Tournapull Wheels	15,750	69	24,841	58
D Scraper Wheels	7,080	31	17,988	42
Total	22,830	100	42,830	100



weight distribution give D Tournapull® fast in all kinds of working conditions

Are you prepared for the big work program ahead?

As State and Federal money becomes available for road construction, your earthmoving contract opportunities increase. At the same time, your need for modern equipment becomes even more important.

For your big production hauling you will want Model C (18-yd.) and Model B (27-yd.) Tournapulls, with their new low, wide, fast-loading Full-pak** scrapers. But for your odds-and-ends work ... for much of your grading, backfilling, backsloping, stripping, shoulder maintenance, ditching, spreading sub-base, stockpiling, landleveling, and

clean-up ... you can use versatile 9-yard D Tournapulls to your greater profit.

Of course, the only way to decide on which machines can serve you best is to consider their ownership-operating cost and see how they fit into your work program. There's a LeTourneau-Westinghouse Distributor in your area who is well qualified to help you analyze your equipment needs, and provide basic facts and figures from which you can reach profitable conclusions. Make a date soon with your L-W Distributor. He can give you the latest facts, figures, and delivery dates.

**Trademark—DP-1423-G.



RIMPULL

Gear	Speed (2,000 rpm)	Rimpull (lbs.)
1	3.2 mph	12,100
2	6.1 mph	6,360
3	11.9 mph	3,260
4	20.7 mph	1,870
5	29.5 mph	1,310

* Usable rimpull depends upon weight of payload and ground conditions.

... for more details circle 261, page 16

GRADEABILITY

Percent of Grade

D TOURNAPULL with SCRAPER		ROLLING RESISTANCE OF HAUL-ROAD									
		65#†		85#†		100#†		150#††		200#†	
		Loaded Unit*	Empty Unit	Loaded Unit*	Empty Unit	Loaded Unit*	Empty Unit	Loaded Unit*	Empty Unit	Loaded Unit*	Empty Unit
Gear	Speed (mph)	%	%	%	%	%	%	%	%	%	%
1st	3.2	25.0	38.1	24.0	37.1	23.3	36.4	20.8	27.0	14.0	16.6
2nd	6.1	11.8	25.1	10.8	24.1	10.1	23.4	7.6	20.9	5.0	16.6
3rd	11.9	4.3	11.2	3.3	10.2	2.6	9.5	0.1	7.0	—	4.5
4th	20.7	1.2	5.1	0.2	4.1	—	3.4	—	0.9	—	—
5th	29.5	—	2.5	—	1.5	—	0.8	—	—	—	—

* 20,000 Pound Payload

† Tractive Efficiency of .6 Used

†† Tractive Efficiency of .5 Used

‡ Tractive Efficiency of .4 Used

LeTourneau **WESTINGHOUSE** Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

GENERAL NYGEN[®] TIRES

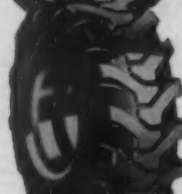


**...built
tougher
for the
toughest
jobs!**

HCT
LOGGER



DTL



EARTH
MOVER



TRACTOR
GRADER



ALL-DUTY
LCM



LCM



Featuring Stronger-than-Steel NYGEN[®] CORD

Designed to make every off-the-road job show a profit, big, rugged General Truck Tires are built to take brutal punishment . . . built to out-perform any other tire on any project. Unexcelled for strength with *exclusive* Nygen Cord construction and delivering dependable tractor-like flotation and traction, Generals provide the ultimate in job-hazard protection. Their job performance records prove Generals best!

specify GENERALS on your new equipment

**THE
GENERAL
TRUCK TIRE**

THE GENERAL TIRE & RUBBER CO. • Akron, Ohio

... for more details circle 240, page 16
ROADS AND STREETS, April, 1957



How a 5½ yard shovel, spotted on narrow benches, digs and trims a 284' deep highway cut

Manitowoc 4500 excavates 600 yards per hour for Bruns Coal Company of Zanesville, Ohio, on highway widening job at Steubenville, Ohio

The Manitowoc Model 4500 will move most of nine hundred thousand yards of material to be excavated during the widening and modernization of 1.823 miles of Ohio State Highway #7 . . . Jefferson County, Ohio. Bruns Coal Company is working their 5½ Yd. rig two 8-hour shifts per day, digging through alternate layers of slate rock, coal seams, slate clay, flint clay and boulders. Blasting ahead of the machine cannot be uniform because of the layered quality of the soil, yet the Manitowoc digs as much as 600 yards per hour.

Bruns uses six 15 Yd. Euclid hauling units moving spoil from the big cut. The narrow benches are so cramped that the shovel must swing out over the lip of the cut when loading. The Manitowoc has a ground bearing pressure of only 9.6 pounds per square inch . . . (less than most one-yard machines)—and is exceptionally compact for a big machine (tailswing radius 19'4"). These factors plus the elevated pilot house (operator's eye level — 15') warrant record yardages without interruption of highway traffic directly below.

Another Manitowoc feature, the tubular dipper stick, has proven its worth in this excavation where the dipper encounters boulder, coal, slate, and clay during one digging cycle. Twisting, uneven dig-

ging forces only dip the dipper slightly and transmit no strain to the boom or shipper shaft, yet lift of the hoist rope maintains an upright dipper position and digging shocks are absorbed without the damage which might necessitate excessive maintenance in any other rig.

Besides the drill rig and hauling units, the Manitowoc is the only other machine on this cut. *Controlled Power* . . . Single diesel engine with a torque converter power take-off gives ample flexible power and speed. 52" drum brakes and 49" clutches, are air operated for the smooth, precise control necessary to cut, trim and finish this 284' deep 1-to-1 slope!

Modern highway construction hinges on the ability and capacity of larger, more efficient equipment. More and more contractors are using Manitowoc Model 4500's for roadwork because of record capacity and extreme mobility. Bid your next job on the basis of a Manitowoc.

Manitowoc Engineering Corp., Manitowoc, Wis.

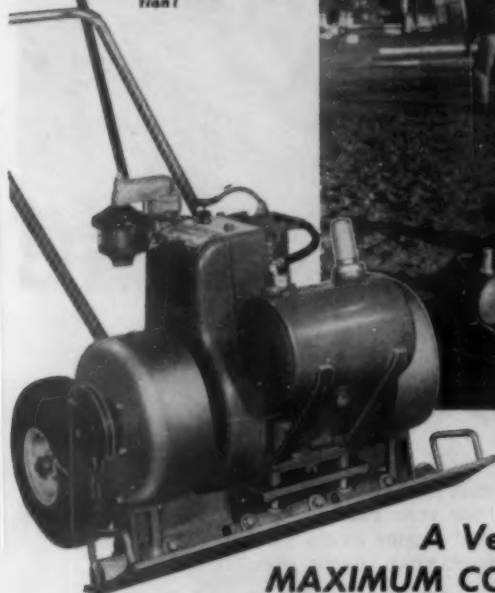


. . . working in close quarters, Manitowoc hangs over the highway, where traffic continues without stop.

. . . for more details circle 274, page 16

THE NEW BARCO VIBRA-TAMP*

* Companion Tool
to the Barco Ram-
mer, Famous for
Deep, Penetrat-
ing Soil Compac-
tion!



**A Versatile Tool for
MAXIMUM COMPACTION of**

- 1. Granular Base Materials**
- 2. Bituminous Surfacing**

EFFICIENT—one man does the work of many with VIBRA-TAMP. Operates in any weather. Works flush against curbs, foundations, and walls.

ECONOMICAL—to buy, operate, and maintain! No special tools required. Saves your bigger, costlier equipment. Tamp up to 750 sq. yds. per hour.

SAFE—moving parts fully enclosed. Special vibration dampers reduce operator fatigue. Simple controls. Handle adjustable to comfortable height.

DURABLE—simple design and quality construction keep VIBRA-TAMP on the job day in and day out. Carburetor unaffected by vibration.

VERSATILE—use VIBRA-TAMP for all kinds of work—wherever low cost is a prime consideration. Take VIBRA-TAMP on the big jobs for hard-to-reach areas. Use it for patching streets, driveways, and roads. VIBRA-TAMP has no economy equal—a real work-horse on sand, gravel, soil, chippings! Ask for new catalog No. 630.

Worldwide Sales and Service

BARCO Serving Industry Since 1908
MANUFACTURING COMPANY, 515-E Hough St., Barrington, Ill.



... for more details circle 210, page 16

Headlines

(Continued from page 36)

and subjects of a similar category. Admission for training calls for a high school diploma or preparatory work of equal grade, including certain specific courses such as Algebra I and II, Plane Geometry, Physics and English.

Western Penn. Association Presents Safety Awards

An annual event in contracting circles in the Pittsburgh area is the annual meeting and safety award ceremony of the Constructors Association of Western Pennsylvania. This meeting was held in February with over 100 contractors present.

Anthony A. Benintend of Ben Construction Company was elected Association president for 1957, with Charles H. Booth, Jr., of Burrell Construction and Supply Company, vice president of the highway division, and Richard A. Wetzig, of Ferguson & Edmondson Company,

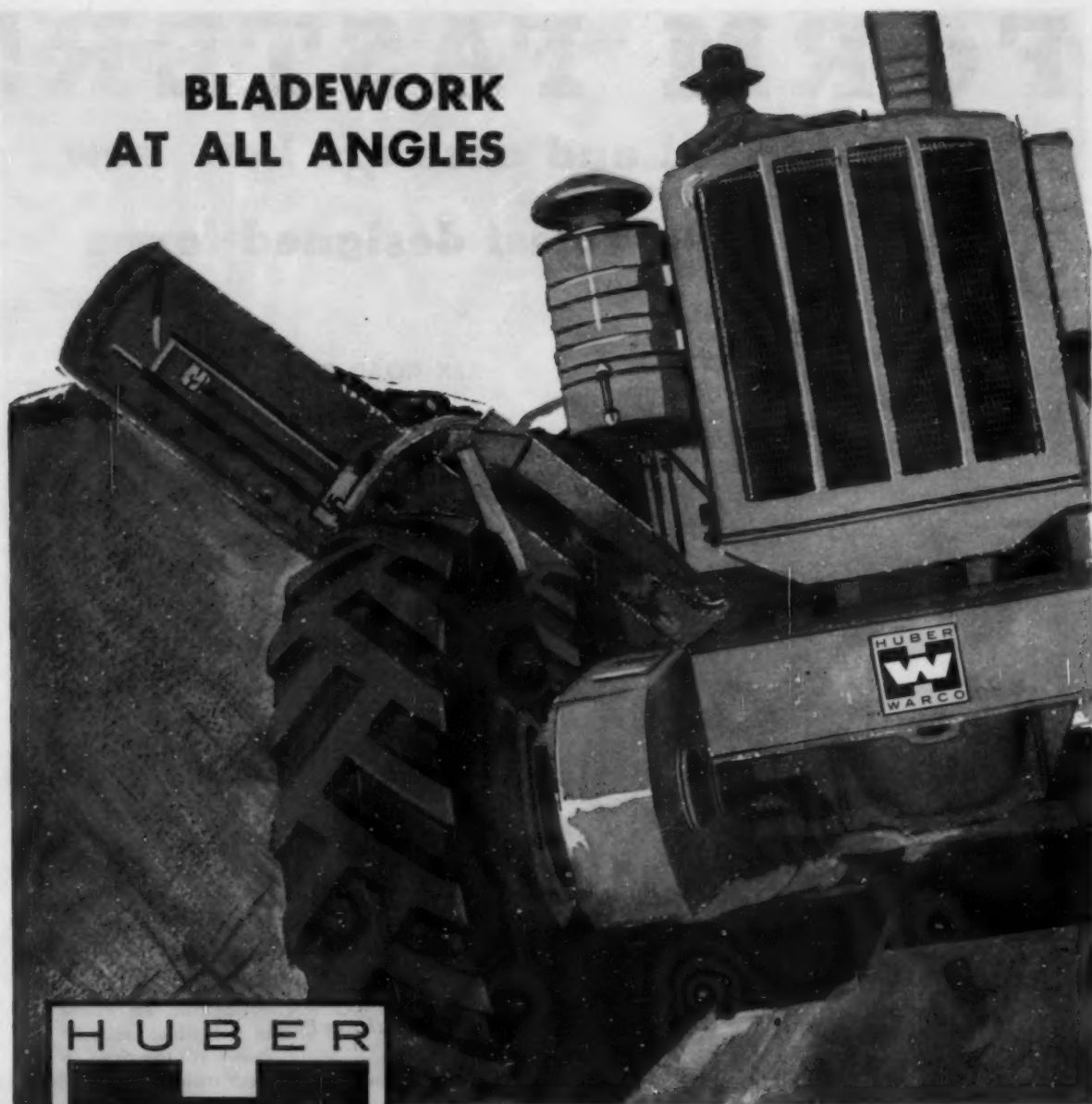


Anthony A. Benintend

vice president for heavy division. Frank Mashuda of the Frank Mashuda Company is treasurer and Howard H. Sturdy of Dravo Corporation, secretary.

One of the highlights of the meeting was the presentation of safety awards to member firms. Bronze plaques were given to Ferguson & Edmondson Company (Class I) for a record of 809,132 manhours with no lost time accidents; Altoona Construction Corporation (Class II) for 99,639 manhours without lost time accidents; and Eichleay Corporation (Class III) for 38,912 manhours without lost time accident.

BLADEWORK AT ALL ANGLES



HUBER-WARCO MOTOR GRADERS

Whether the job calls for bank-sloping, back-up pass or just moving the blade out a little farther to pick up a windrow . . . there's no problem. Any desired blade position is possible on the Huber-Warco motor graders, and each position is hydraulically controlled from the cab through the exclusive saddle design and power-sliding moldboard. There are no manual adjustments to be made. There are 10 standard transmission and torque converter models available ranging from 75 to 195 h.p. See your nearest Huber-Warco distributor for details.

HUBER-WARCO COMPANY
MARION, OHIO

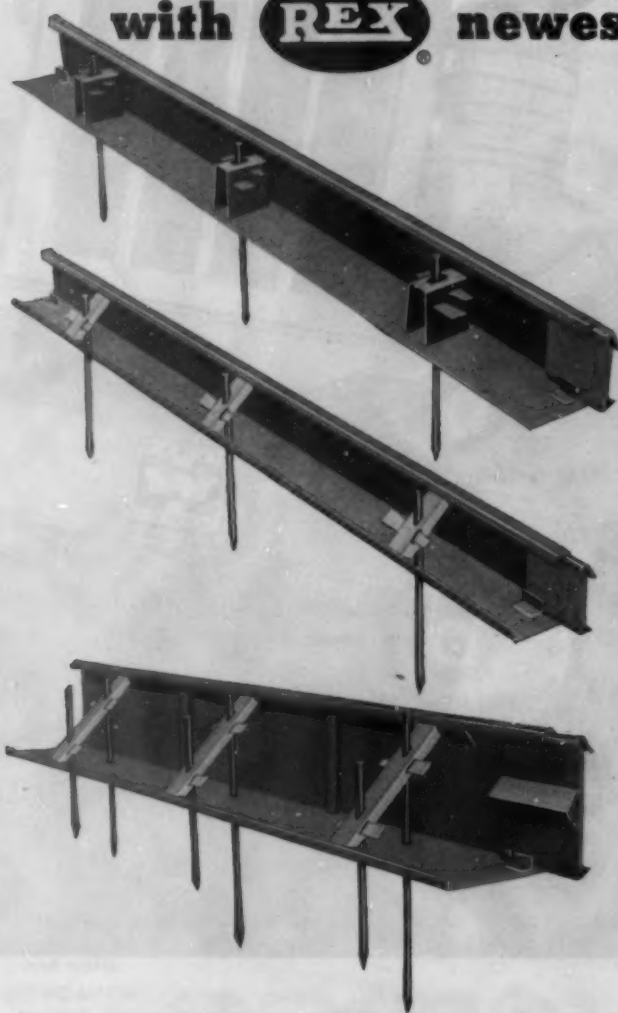
. . . for more details circle 323, page 16

ROADS AND STREETS, April, 1957

FORM FASTER!

greater speed and ease are here now

with **REX** newest designed forms



REX ROAD FORMS

Profit more from all the high-speed features of up-to-date design. Slice your forming time and costs on every job with Rex Forms. The only line of single and double wedge stake pocket forms with standard slide lock connections—they're *interchangeable*! Built stronger for today's heavier form-traveling machines with special all-welded, alloy steel construction. All needed sizes—all available for fastest delivery. Also specials for any particular requirements. *Check Rex first!*

REX AIRPORT FORMS

The high-strength forms with the rapid setting advantages. Rugged double stake pocket construction with perfect-fit slide locks gives better alignment. 100% welded of special alloy steel for maximum strength and rigidity...lasting durability. In the sizes you need—with the speedy delivery you want. Also new Rex Two-Way Airport Forms—with the double advantages of handling two slab thicknesses with one set of forms. *Check Rex First!*

REX is the complete Concrete Paving Line!

Cut your costs and assure best results—take advantage of the job-speeding benefits of the complete Rex Concrete Road Builders Line: Pavers... Spreaders... Finishers... Float Machines... Curing Machines (all available

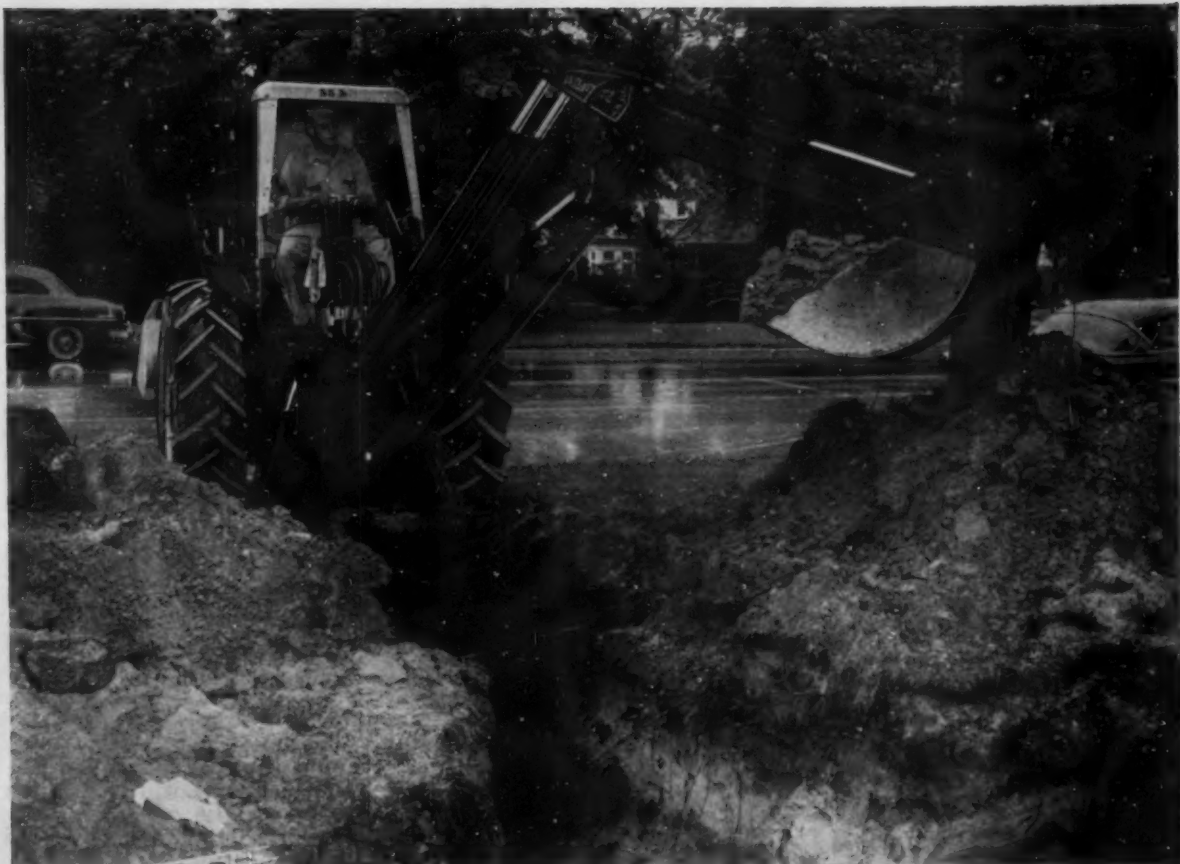
with powered-frame widening and transportation rigs)...Subgrade Planers and Testers. Also Curb, Gutter and Sidewalk Forms. CHAIN Belt Company, 4652 W. Greenfield Ave., Milwaukee 1, Wisconsin.



PAVERS • SPREADERS • FINISHERS • FLOATS • CURING MACHINES • FORMS

CHAIN BELT COMPANY

MOTO-MIXERS • BUILDING MIXERS • PUMPCRETE • RAILPORTER • PUMPS



City of Dearborn, Michigan, Saves Money With Sherman Digger-Loader

The City of Dearborn's Water Department has found its Sherman Major Digger-Loader combination to be one of the most versatile pieces of equipment it owns.

The Sherman unit is used almost continually for pipeline construction work, laying water lines, setting fire hydrants, and for repairing and maintaining water and service lines to homes.

Once the excavation is completed, the Loader takes over. Loading trucks with a fast cycling Sherman Loader, cleaning up around a job, back-filling, grading and levelling, stripping . . . all are performed quickly and economically with the

same basic piece of equipment which was used to dig the hole *and* by the same operator.

As Mr. Molner, the operator, puts it, "We couldn't do the jobs we are doing with any other machine. We've got to have the power and strength the Sherman Major offers to dig as hard and as deep as we do. We also use the unit to load our machinery on and off the trucks, to lower pipes and hydrants into trenches and holes, etc."

Other cities, too, are finding out how this economical Digger-Loader combination can save them money. Call your local Ford Tractor dealer today or write for Bulletin No. 3557.

See the Sherman
Power Digger soon
at your local
FORD TRACTOR DEALER

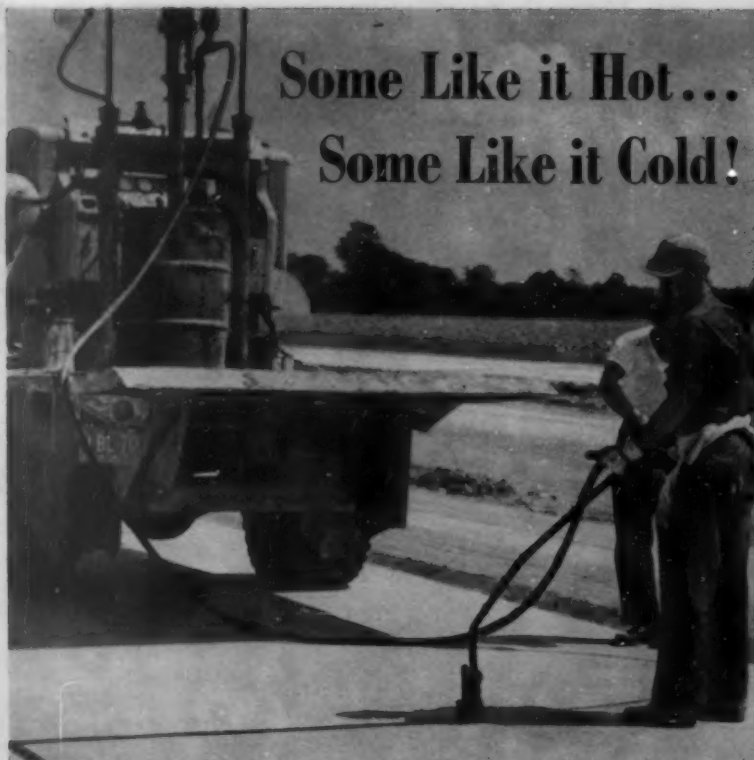


*Designed, Engineered and
Manufactured jointly by
Sherman Products, Inc.,
Royal Oak, Michigan,
Wain-Roy Corporation,
Hubbardston, Mass.

. . . for more details circle 291, page 16

ROADS AND STREETS, April, 1957

© 1956 Sherman Products Inc.



**Some Like it Hot...
Some Like it Cold!**

*but whatever your preference
in paving joint sealers...*

you're sure of top quality performance

with PRESSTITE-KEYSTONE Paving Products

Whether you're a cold-applied advocate or a proponent of the hot pour—PRESSTITE-KEYSTONE offers you the latest and the finest in both types of paving joint sealers.

These two reliable names are your assurance of controlled quality, dependable delivery and a personalized engineering service. Add to this your advantages of one complete buying source, one convenient inventory and billing account, plus the big savings of mixed-carload shipment.

**make PRESSTITE-KEYSTONE your one-stop source
for all your paving product needs**

- Presstite Cold-Applied Joint Sealer #67
- Presstite Cold Applied Jet Airfield Joint Sealer #99
- Kapco® Hot Pour Asphalt Rubber Joint Sealing Compound
- Kapco® Hot Pour Jet Airfield Joint Sealer
- Kapseal® Crack Filler

ALSO: All types of pre-formed Expansion Joints, Tongue & Groove Joints, Concrete Curing Compounds, etc.



A Division of AMERICAN-MARIETTA COMPANY
3782 CHOUTEAU AVENUE, ST. LOUIS 10, MISSOURI

... for more details circle 284, page 16

New Publications

Supplement to Blasting Manual Issued by Copco

Publication of the fourth supplement to the internationally circulated "Manual on Rock Blasting" is announced by Atlas Copco, major producer of pneumatic equipment for mining, tunneling, contracting and industry.

The new supplement, available from Atlas Copco at a production cost of \$3 per copy, includes articles on "Sub-level Caving in Swedish Mines" written by J. Hedlund and B. K. Lundin, "The Effects of Blasting on Nearby Structures" by Fred E. Cornwell and "Compressed Air Lines for Mines and Construction Sites" by C. J. Tallberg. Copies of the two-volume manual, including all four supplements, are available at a production cost of \$28.90.

The authoritative manual was first published by Sandvikens Jernverks Aktiebolaget and Atlas Copco AB in 1952 as an international engineering handbook. It was a direct result of a 1949 congress on rock blasting in Paris at which engineers from throughout the world demonstrated the need for a universal reference work.

Edited by Dr. K. H. Fraenkel of the Swedish State Power Board, the manual—prepared in looseleaf form in English, French, German and Swedish—includes technical reports by prominent metallurgical, civil, mining and mechanical engineers as well as professors from leading engineering colleges.

Copies of the new supplement and complete manual are available both from Atlas Copco Eastern, Inc. of Paterson, New Jersey, and Atlas Copco Pacific, Inc. of San Carlos, California.

A NEW WAY TO REDUCE WORKMEN'S COMPENSATION INSURANCE COST. Published by Liberty Mutual Insurance Co., 175 Berkeley St., Boston 17, Mass. 44 pages, illus. Practical methods of sharply reducing workmen's compensation insurance costs are described. The booklet outlines the four basic components in the medical and health program which this large mutual casualty firm has developed: an in-plant medical plan, an industrial hygiene program, a medical ad-

(Continued on page 52)

New **POWER-TURN** Steering

gives you tighter turns with two-track power

Look at that turn! That's what a tight turn looks like with *full power on both tracks*. It means 100% working power at all times, even on the sharpest turns. It means added work capacity. It's **POWER-TURN** steering—another exclusive Oliver development.



OLIVER OC-12



...More push for your profits, too!

With 53 drawbar h.p., the OC-12 is one of the most powerful tractors of its class. Now **POWER-TURN** makes it pay still bigger dividends. You sweep through turns of *any* radius with full load. Or hold a straight line in angle dozing with the heaviest off-center loads.

Yet **POWER-TURN** is actually simpler. Two interconnected systems of control provide planetary reduction gears on each track. Here is the maximum in efficient flow of power, 100% tractive

turns, better maneuvering. Operation is easier, too, with finger-tip controls to take all the muscle out of it.

In addition to **POWER-TURN**, the new OC-12 offers new over-center hand clutch and foot brake for greater operator convenience. Why not sit at the controls yourself and see the difference? Your Oliver distributor will gladly demonstrate. Call him today.

THE OLIVER CORPORATION

400 West Madison Street, Chicago 6, Illinois

... for more details circle 278, page 16

ROADS AND STREETS, April, 1957

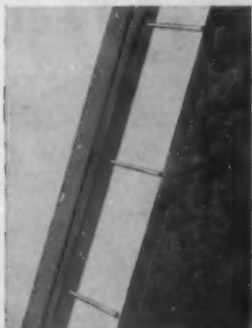


A COMPLETE LINE OF INDUSTRIAL WHEEL AND CRAWLER TRACTORS AND MATCHED ALLIED EQUIPMENT

DURAJOINT[®] POLYVINYLCHLORIDE—PVC

WATERSTOPS

FOR EXPANSION AND CONSTRUCTION JOINTS



St. Lawrence Power Project, Power House



Warsak Hydro-Electric Project of Pakistan



McCormick Dam, Project No. 2

Specified-

**USED IN OUTSTANDING
ENGINEERING PROJECTS
AROUND THE WORLD**

ADVANTAGES

"DURAJOINT" Waterstops, although only recently introduced to the U.S. market, have been chosen by Architects and Engineers the world over as the ideal waterstop for the elimination of water seepage and leaks through the expansion and construction joints of concrete structures. "DURAJOINT", compounded of a special Polyvinylchloride, is extruded with uniquely designed longitudinal ridges on both sides that insure the distribution of critical pressures and enhance the holding power. "DURAJOINT'S" extreme elasticity and excellent tear resistance allow it to successfully handle vertical or lateral movements of masses of concrete without being sheared. You, too, can specify "DURAJOINT" and be secure in the knowledge that this waterstop will, undoubtedly, outlast the construction it's used in.

- Resistant to extreme waterhead pressures
- Tensile strength of not less than 1900 lbs. per square inch
- Superior holding strength... elongation ability of more than 350%
- Effective temperature range of -54°F. to +176°F.
- Chemically inert... resistant to acids, alkalis, weather, chlorinated water, oil, fungus, etc.
- Quickly, easily spliced "on the job" by merely applying heat and holding the ends together... requires no welding or vulcanizing equipment
- Available in lightweight, easy to handle 50 ft. coils... withstands abuse without damage



"DURAJOINT" enjoys national distribution through the outlets of Tecon Products Inc. in the 11 western states and W. R. Meadows, Inc. in the other 37 states of the mid-western, southern and eastern portions of the United States. Write today for complete information.

A PRODUCT OF ELECTROVERT
Available in your area through...

**TECON PRODUCTS
INC.**

304 S. ALASKAN WAY
SEATTLE 4, WASHINGTON



**W. R. MEADOWS,
INC.**

28 KIMBALL STREET
ELGIN, ILLINOIS

... for more details circle 232, page 16

New Publications

(Continued from page 50)

visory service and a rehabilitation program.

The company maintains rehabilitation centers in Boston and Chicago as well as a special hospital center for spinal injury cases in Boston. These centers, which were pioneered by Liberty, have returned a large majority of patients treated to work.

FLEXIBLE PAVEMENT DESIGN IN FOUR STATES. Four reports were presented at the 35th Annual Meeting of the Highway Research Board in January 1956, by highway engineers representing Maryland, Colorado, Alabama and Washington. They were sponsored by the Committee on Flexible Pavement Design, A. C. Benkelman, chairman, in accordance with a planned effort to obtain such reports from all states and other agencies which may undertake to perfect methods of design.

Price \$1.00 remitted to the Highway Research Board, 2101 Constitution Avenue, Washington 25, D. C.

PRE-TENSIONED BONDED PRESTRESSED CONCRETE. A new brochure (No. PC-932) has been published by John A. Roebling's Sons Corp., subsidiary of Colorado Fuel and Iron Corp., Trenton 2, N. J.

The booklet reviews the rapid rise in the use of prestressing, uses cross sections and job pictures for typical bridge structures, piling, buildings and other new developments; and discusses casting bed details and operations.

A section is also devoted to tensioning strands. For a free copy, address the Construction Materials Division of the above firm.

MEDIAN DESIGN: EFFECT ON TRAFFIC BEHAVIOR. Two reports on research studying the effects of different types and widths of median dividers on traffic behavior and accidents are contained in this bulletin.

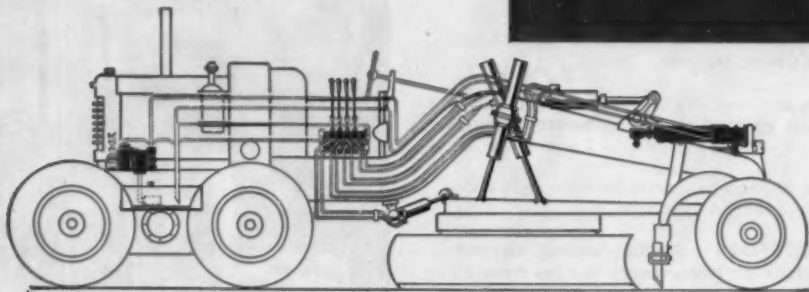
The first paper gives the results of observations and comparisons made in New York State and supplements earlier studies on multi-lane highways in that state reported

(Continued on page 56)

"Nobody puts a fine painting in a dime-store frame." When you see a piece of construction equipment with Vickers Hydraulics, you know it is a "quality" machine throughout.

Vickers provides all the inherent advantages of hydraulics and MUCH MORE: (1) the benefits of a nation-wide and full-time field engineering and service organization of unequalled experience; (2) a complete line of equipment enables Vickers to take UNDIVIDED system responsibility thus eliminating any risk of incompatibility of hydraulic components; (3) a hydraulics school for free training of customers' maintenance personnel. For further information, ask for Bulletin M5101A.

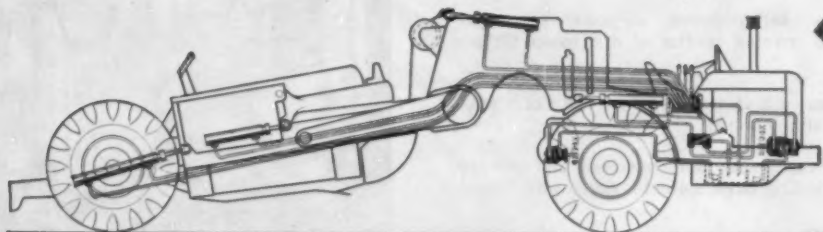
VICKERS HYDRAULICS means "QUALITY" CONSTRUCTION EQUIPMENT



Motor grader uses Vickers Hydraulics for:

- maximum blade utility
- accurate and effortless tool adjustment
- positioning scarifier
- convenience of control to operator

Hydraulic motor (not shown) rotates blade on circle. Hydraulic power steering is separate circuit. Central hydraulic system is applicable.



Scraper has VARIABLE rate hydraulic power steering provided by:

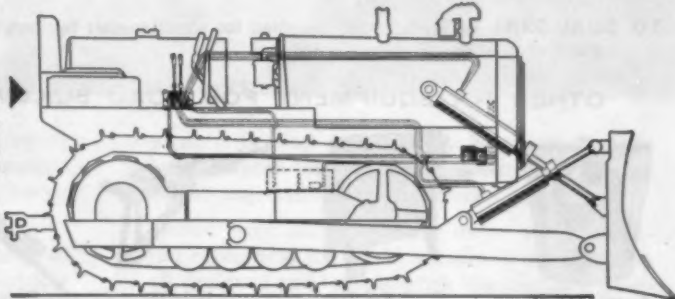
- Vickers Double Vane Pump
- Vickers Metering Control Valve
- Vickers Circuit-Splitting Unloading System
- Vickers Overload Relief Protection

Vickers Single Vane Pump supplies power for:

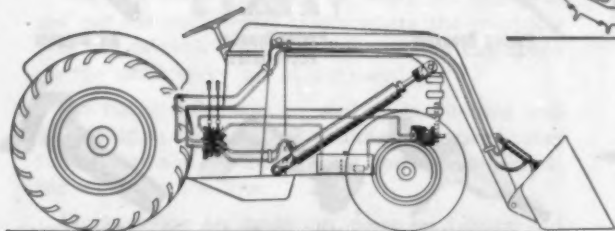
- Fast actuation of bowl
- Fast apron manipulation
- Fast—Positive ejector action

More Work—Less Time—Minimum Maintenance.

Vickers Hydraulics provides fast lifting and angling of bulldozer blade along with exclusive "feathering" ability. Additional tractor attachments added later can be hydraulically controlled by simply adding sections to existing control valve thus eliminating necessity of mounting separate valves.



Fast, easy and dependable operation of front end loader utilizes Vickers Balanced Vane Pump (with inherent automatic wear compensation) and Vickers Two-Section Directional Control Valve. Note simplicity of installation.



Write for bulletin M5101A
it discusses the MANY BENEFITS
you get from **VICKERS HYDRAULICS**

VICKERS INCORPORATED

Mobile Hydraulics Division

ADMINISTRATIVE and ENGINEERING CENTER
DEPARTMENT 1432 • DETROIT 32, MICH.

Application Engineering Offices: • ATLANTA • CHICAGO • CINCINNATI • CLEVELAND • DETROIT • GRAND RAPIDS • HOUSTON • LOS ANGELES AREA (El Segundo)
MINNEAPOLIS • NEW YORK AREA (Summit, N.J.) • PHILADELPHIA AREA (Media) • PITTSBURGH AREA (Mt. Lebanon) • PORTLAND, ORE. • ROCHESTER • ROCKFORD
SAN FRANCISCO AREA (Berkeley) • SEATTLE • ST. LOUIS • TULSA • WASHINGTON • WORCESTER 7752
IN CANADA: Vickers-Sperry of Canada, Ltd., Toronto

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

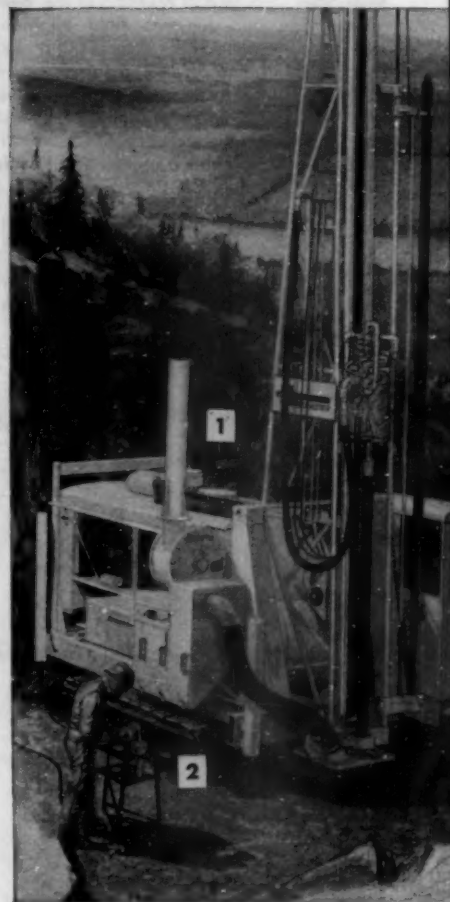
... for more details circle 313, page 16

ROADS AND STREETS, April, 1957

How Equipment fits into the

*...helping to meet contract dates
every bit of the way*

- 1 **DRILLMASTER** — Completely self-contained, self-propelled blast-hole rig for rotary or percussion drilling with the advanced design "down-the-hole" drill.
- 2 **BIT GRINDER** — Air-powered hand grinding unit and stand for fast, on-the-spot resharpening of large-size Carset Jackbits.
- 3 **WAGON DRILLS** — Provide complete flexibility for fast, efficient drilling in any position. Easily moved about by hand or with air hoists mounted on the unit.
- 4 **JACKHAMERS** — A complete line of hand-held drills with the right combination of weight and power for secondary drilling jobs.
- 5 **GYRO-FLO PORTABLE COMPRESSORS** — Smooth-running, dependable, virtually maintenance-free rotary air compressors in sizes from 85 to 900 cfm.
- 6 **CRAWL-IR** — Completely new, self-propelled, air-powered, crawler-mounted drill, with hydraulic or manual control of drill tower tilt and swing.
- 7 **HYDRA-BOOMS** — Gyro-Flo powered and mounted on a truck or tractor, they speed multiple hole drilling at any angle.
- 8 **QUARRYMASTER** — The larger completely self-contained and self-propelled blast-hole drilling rig for drilling large diameter holes with "down-the-hole" drill.
- 9 **FORM-PIN DRIVERS** — Standard I-R Paving Breakers with special front-heads, drive pins as fast as you can set them.
- 10 **DUAL-DRILL RIG** — Specially designed for simultaneous two-hole drilling in trench work.



OTHER I-R EQUIPMENT FOR ROAD BUILDING



Carset Jackbits



Bit & Rod Shop Equipment



Jackdrills and Jacklegs



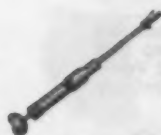
Paving Breakers



Paving-Breaker Accessories



Air Diggers



Backfill Tampers



Sump Pumps



Air Drills



Impacttools



Multivane Grinders



Riveters and Chipping Hammers



Concrete Vibrators



Air Saws



Air Hoists



Spot-Air Compressors

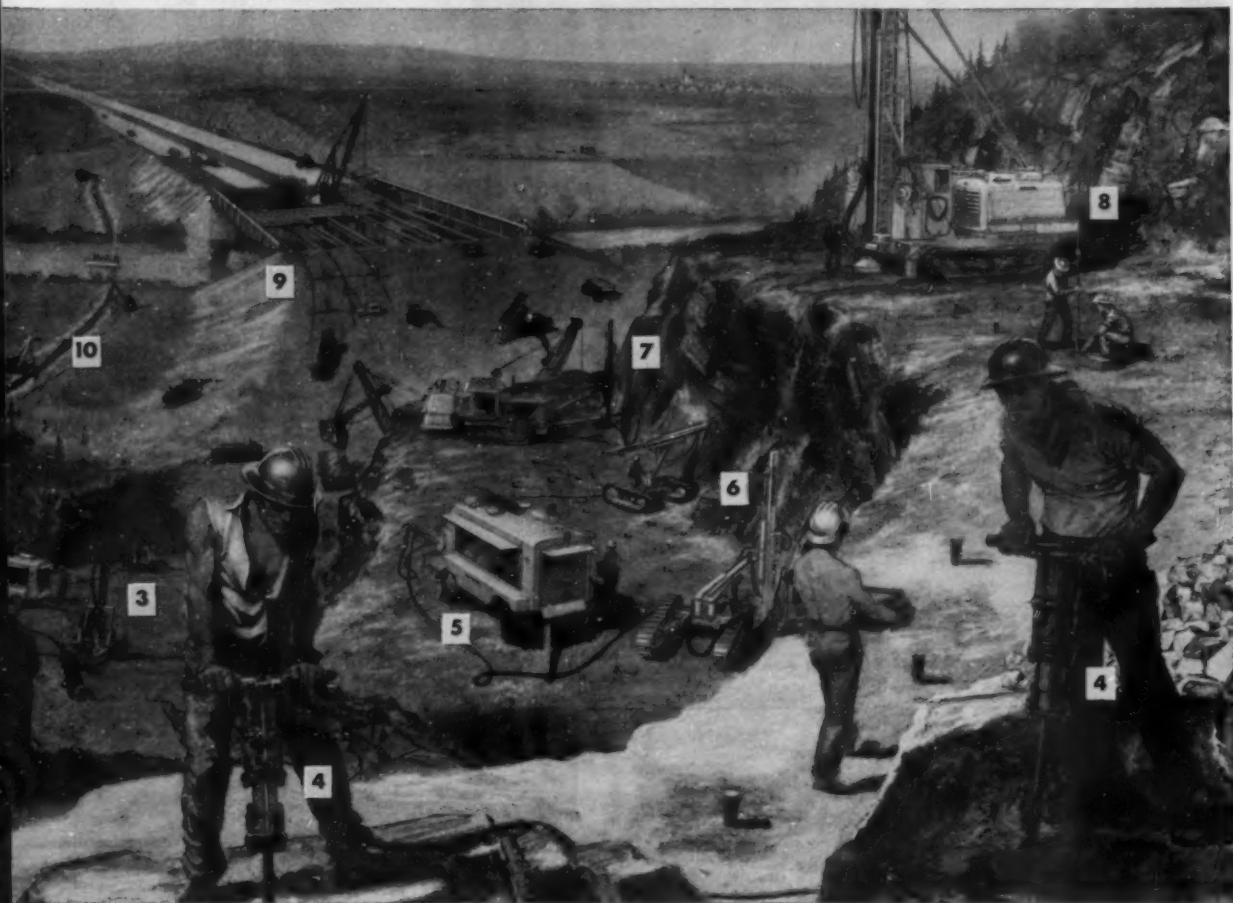


Stationary Compressors



Motorpumps

Highway Construction Picture



FROM big rock cuts to form-pin driving and back-fill tamping, Ingersoll-Rand air power equipment plays a leading role in modern highway construction.

The first and biggest job on many sections is to get out the rock — and that's where the complete I-R line of rock drills and compressors can speed up the work every bit of the way.

On tunnel jobs, too, as well as in ditching and pipelining, specialized I-R drilling equipment saves time, effort and expense — helps you keep to schedule all along the line.

Work-saving air tools cut costs on bridge and structural steelwork, on wood forms and shoring,

concrete vibrating and literally hundreds of jobs where operator fatigue can be reduced by use of low-cost Ingersoll-Rand air power.

Shown here are the major items of Ingersoll-Rand equipment for modern highway construction — all designed and built to work together as a time-saving, cost-saving *Contractors' Combination*.

For the complete story, be sure to write for your copy of Bulletin No. 202D.



14-474

Ingersoll-Rand

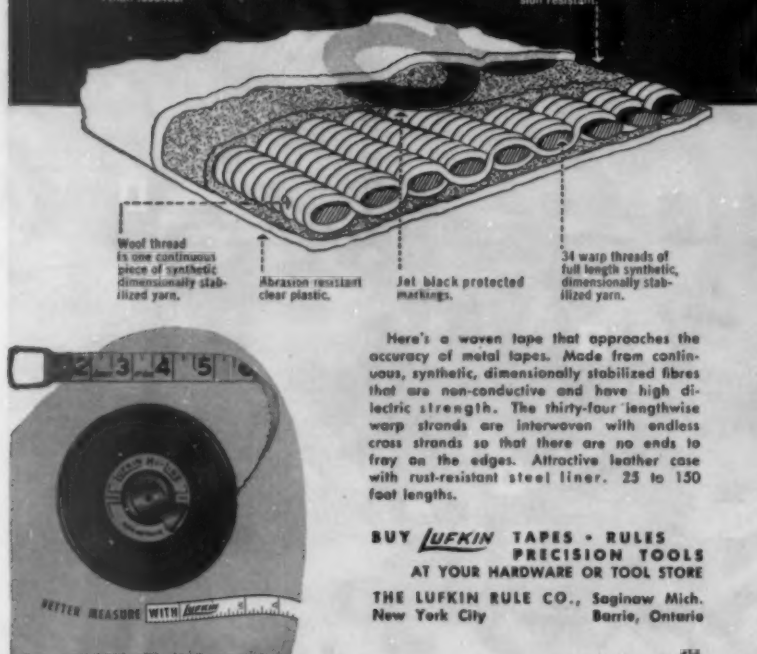
11 Broadway, New York 4, N. Y.

WHY LUFKIN HI-LINE WOVEN TAPES are more accurate

Percentage variation caused by moisture or temperature less than .000405.

Tensile strength 21,035 PSI.

Miracle epoxy resin coating, waterproof, corrosion and abrasion resistant.



Wool thread is one continuous piece of synthetic dimensionally stabilized yarn.

Abrasion-resistant clear plastic.

Jet black protected markings.

34 warp threads of full length synthetic, dimensionally stabilized yarn.

Here's a woven tape that approaches the accuracy of metal tapes. Made from continuous, synthetic, dimensionally stabilized fibres that are non-conductive and have high dielectric strength. The thirty-four lengthwise warp strands are interwoven with endless cross strands so that there are no ends to fray on the edges. Attractive leather case with rust-resistant steel liner. 25 to 150 foot lengths.

**BUY LUFKIN TAPES • RULES
PRECISION TOOLS
AT YOUR HARDWARE OR TOOL STORE**

THE LUFKIN RULE CO., Saginaw Mich.
New York City Barrie, Ontario

... for more details circle 268, page 16

SYNTRON ELECTROMAGNETIC ELECTRIC HAMMERS

Syntron Electric Hammers save time and lower job costs drilling, cutting, chipping, scaling paint, etc. Designed and built for continuous operation day after day even on the toughest jobs with a minimum of maintenance. There are no gears, cams etc, to cause down time. Maintenance is simple and low cost. Available in capacities from $\frac{3}{8}$ " dia. to 2" dia. holes. Also available with same capacities SYNTRON Electric Hammer Drills with automatic bit rotation.



MASS CONCRETE VIBRATORS



VIBRATORY COMPACTORS



GASOLINE HAMMER PAVING BREAKERS



Write for complete catalog data—FREE

SYNTRON COMPANY

384 Lexington Ave. Homer City, Penna.

... for more details circle 301, page 16

New Publications

(Continued from page 52)

to the Board in 1951 (HRB Bulletin 35). Both traversable and barrier-type medians were investigated in the New York studies and discussed on their effect on modern highway travel.

The other report, prepared at the Yale University Bureau of Highway Traffic, gives an analysis of accident experience involving various widths of traversable medians on limited access highways. The influence of trees planted in a median is discussed.

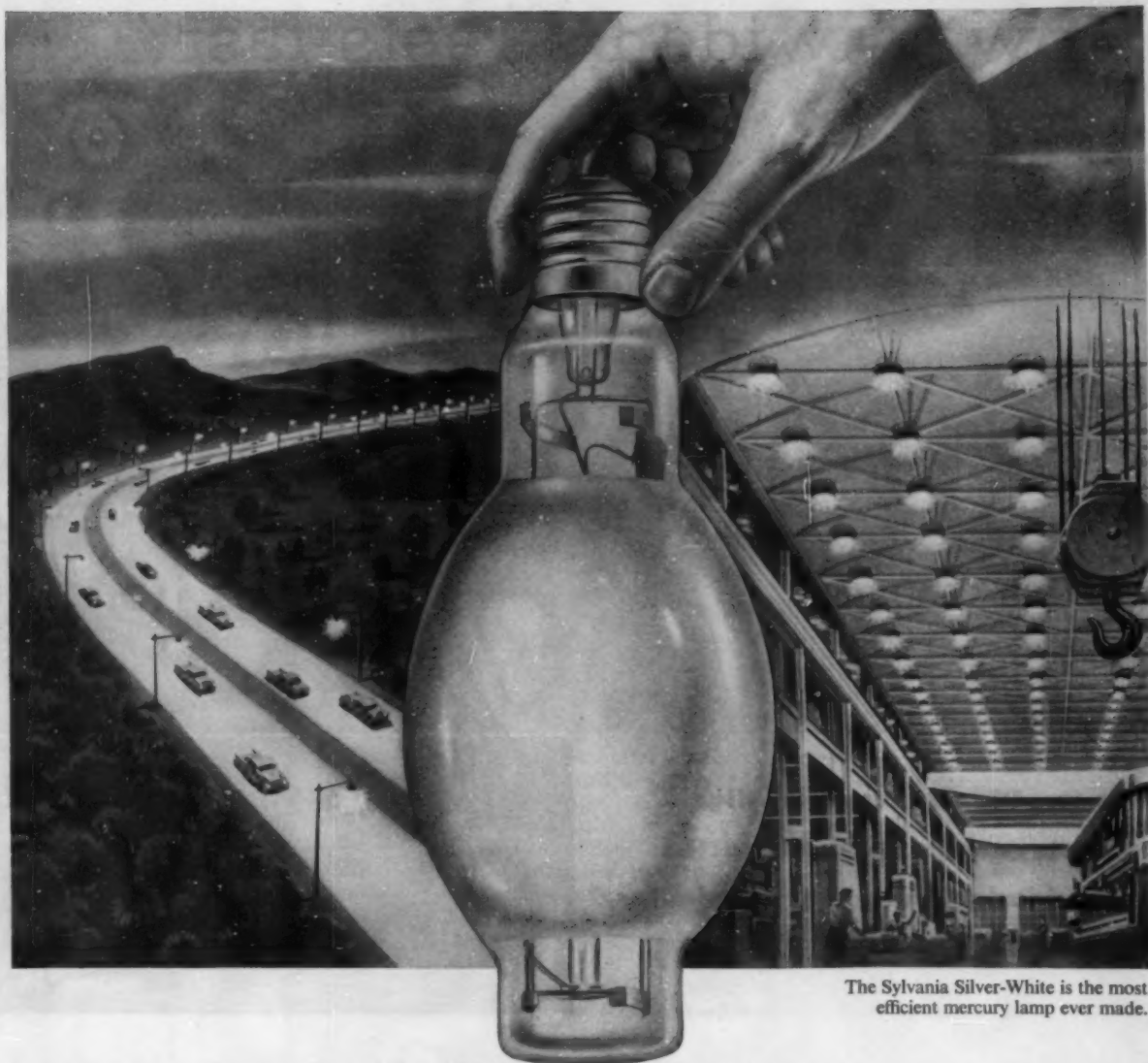
Price \$0.60 remitted to the Highway Research Board 2101 Constitution Ave., Washington 25, D.C.

CONSULTANT DATA. Publications of interest to consulting engineers and those concerned with the relationships with consultants have been issued by the Michigan Engineering Society. These include a "Manual of Consulting and Design Engineering Practices," a 20-page booklet "Outline of Engineering Services," "Definitions in Outline of Services," "Agreements and Scope of Services," "Bases for Engineering Fees," "Suggested Percentage Fee Rates," "Estimating Chart," "Sample Agreement Forms," and "Canons of Ethics for Engineers."

The result of prolonged committee action, these documents are available on request to J. E. Wilbur, Executive Secretary, Michigan Engineering Society, P.O. Box 573, Kalamazoo, Mich.

IMPROVING HUMAN RELATIONS. A discussion written for the aid of top management personnel, while primarily directed to industrial executives, has thinking of value to highway and municipal officials, as well as construction contractor executives. Available on request to the National Association of Manufacturers, 2 East 48th St., New York 17, N. Y.

FACTORS INFLUENCING GROUND FREEZING. Bulletin 135, Highway Research Board, 2101 Constitution Avenue, Washington 25, D.C. Seventh in a series of publications containing annual meeting papers, sponsored by the Board's Committee on Frost Heave and Frost Action in Soil. Price \$3.40.



The Sylvania Silver-White is the most efficient mercury lamp ever made.

For highway ... or high-bay ... the one-lamp answer to both lighting needs

Today's most efficient mercury-vapor lamp is the new Sylvania Silver-White.

The greater light output and superior color quality of the Silver-White makes it an effective, versatile lighting source ... it serves the high requirements for such widely different applications as highway lighting and high-bay plant illumination with unequalled efficiency.

Sylvania's Silver-White actually delivers up to 33% more lumens of light than previous color-improved mercury-

vapor lamps. The 100-watt lamps, for example, are producing an unprecedented 4000 lumens in actual installations.

Sylvania Silver-White lamps cost no more than conventional color-improved lamps—but offer the combined economies of superior light output and superior construction.

Silver-White lamps are available in 100-, 175-, 400-, 700-, and 1000-watt types to meet the needs of industry for efficient high-bay indoor lighting and

outdoor illumination for parking and loading areas ... and for the governmental requirements for effective highway lighting.

For complete information about the Sylvania Silver-White Mercury Vapor lamp, call your local representative, or write:

SYLVANIA ELECTRIC PRODUCTS INC.
Lighting Division, Dept. 7L-7204
60 Boston St., Salem, Mass.
In Canada: Sylvania Electric (Canada) Ltd.
Shell Tower Building, Montreal

SYLVANIA

... the fastest growing name in sight

LIGHTING • RADIO • ELECTRONICS • TELEVISION • ATOMIC ENERGY
... for more details circle 300, page 14

ROADS AND STREETS, April, 1957

How to widen streets fast



This No. 977 Traxcavator* digs concrete, asphalt and compacted earth, loads a truck every 2 minutes, grades as it goes



Vogel Construction Corp. was widening 1.6 miles of 38th Street, Indianapolis, Ind., when this picture was taken. The job included excavating 40,000 cu. yd. of old concrete, digging up front yards and driveways. Street width was increased from 40 to 80 feet. And most of the work was done by a CAT* No. 977 Traxcavator.

Hard earth, broken concrete and asphalt are tough materials to dig, but the machine's superior pry-out action resulted in full bucket loads. The main problem was keeping enough trucks under the bucket. The No. 977 was loading a truck in less than 2 minutes, and it maintained a good level grade as it dug. Vogel Construction Corp. also found the No. 977 good at skimming asphalt off of old pavement.

Caterpillar-built Traxcavators have been designed for one purpose—to increase your production and cut costs. The No. 977, largest of the line, gives you the power and performance for big road jobs. Its 100 HP engine and ample track surface back up the 2¼ cu. yd. bucket with

tremendous digging force. Quick-acting hydraulic controls add to the machine's great maneuverability. It's easy to operate and has maximum job visibility.

Balanced weight distribution makes for good stability on rough terrain or steep grades. The 40-degree tilt-back of the bucket at ground level prevents spillage. And the bucket can be raised almost 12 feet for high load clearance.

Get the full story of this rugged, modern excavating tool from your Caterpillar Dealer. He'll demonstrate the No. 977's performance on your own job, and he stands behind its long, profitable work life with dependable service and parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

**BUILT FOR
THE HARD WORK**

... for more details circle 216, page 16

BERMS HELPED PROTECT RAILROAD

in Blasting Turnpike Cut

Good safety record achieved by M. A. Gammino Construction Co. in handling 680,000 cubic yards of rock excavation on Connecticut Turnpike project.

**Third in a Series
on Rock Excavation
Along Connecticut
Turnpike**

A BLASTING situation tailor-made for potential trouble was faced by the contractors on the Connecticut Turnpike just east of New Haven. Here in the midst of contract section 319-01, the M. A. Gammino Construction Co. had to take 145,000 cu. yd. of rock out of a hillside immediately paralleling the New Haven Railroad's multiple-track main line.

The rock came out, on schedule. But trouble never had a chance

to occur, thanks to good job planning by the contractor's experienced organization.

This particular cut, known as the Saltonstall Cut, was one of the largest in a 5½-mile turnpike segment involving 680,000 cu. yd. of rock, 1,200,000 cu. yd. of earth excavation, 300,000 cu. yd. of borrow, plus 17 structures and paving—an \$8,188,000 package contract, awarded in February of 1956.

The equipment for the grading

● Excavation of cut in progress as of May, 1956, showing the proximity of the rail line.





● Another of several types of compressed air hook-ups used by the Gammino crew. Here hose lines from three "600" compressors tap into a 6-inch pipe about 30 ft. long in the absence of a receiver. Individual hose lines to wagon drills take off from a manifold at far end of pipe.

● Clean-up work at cut ends, such as is shown here, was a factor in planning yardage production. This shovel is a P & H 3½-yd. loading to a Euclid rear-dump, with a Cat dozer "sweeping the crumbs under the rug."

consisted of 3 P & H Model 1055 3½-yd. shovels, 2 Northwest 80D 2½-yd. shovels, 15 Euclid 25-ton end-dumps and 4 Euclid 18-yd. bottom dumps (with GM Detroit Diesel engines), 15 wagon drills (Ingersoll-Rand and Gardner-Denver), 3 Gardner-Denver Air Trac drills, 8 Ingersoll-Rand 600 Gyro-Flo compressors, 1 Caterpillar D9 and 8 D8 dozers and pushers, 4 Cat DW21 scraper units, a Lorain motor crane, and miscellaneous service equipment—quite a spread! Also, as will be covered in a later report, Gammino had a Manitowoc 5½-yd. dragline and a Northwest 80D dragline at work respectively on a 300,000 cu. yd. swamp area and on the heavy drainage work.

The rock excavation which is the principal subject of this review was handled by three basic spreads. For the big cut, one 3½-yd. shovel was used supported by a varying number of drills and compressors. The cut as here pictured in the various stages was a side-hill affair involving fissured traprock removal into a bluff immediately alongside the railroad right-of-way. The cut has a maximum depth of 142 ft. on the uphill side.

It was decided to take the cut down in benches of about 24 ft. But before mapping out the procedure, conferences were held with rail officials. It was agreed to conform to the pattern of cooperation followed by the various turnpike contractors, namely, that of employing flagmen at all working hours, and shooting only at non-rush hour periods when there was at least a 30-minute interval between trains. A railroad representative stationed along the work gave the all-clear signal.

The first two benches (see sketch), high up and well back in the bluff, consisted largely of decomposed rock and soil overburden. These lifts were removed by a pair of heavy bulldozers which prepared a ledge for the shovel.

While this preliminary scalping work was in progress, other dozer operators built up an earth berm 6 to 8 ft. high and 15 to 20 ft. wide all along the base of the cliff. This barrier which left only about 6 ft. clearance on the railroad side, was designed to catch any rolling rocks or sliding material that might otherwise stray out on the tracks.

The shovel then got into the act. As each lift was removed, the operator left a prism-shaped berm of undisturbed material on the railroad side. This berm served as a further bunker or baffle to catch any



- One drill-and-compressor arrangement used by Gammino. Consists of two Ingersoll-Rand Gyro-Flo 600 compressors, a 3,000 cubic foot receiver tank, a length of 6-inch steel pipe, a trunk hose line and manifold with lines to the drills. Drills are Gardner-Denver Air Tracs.

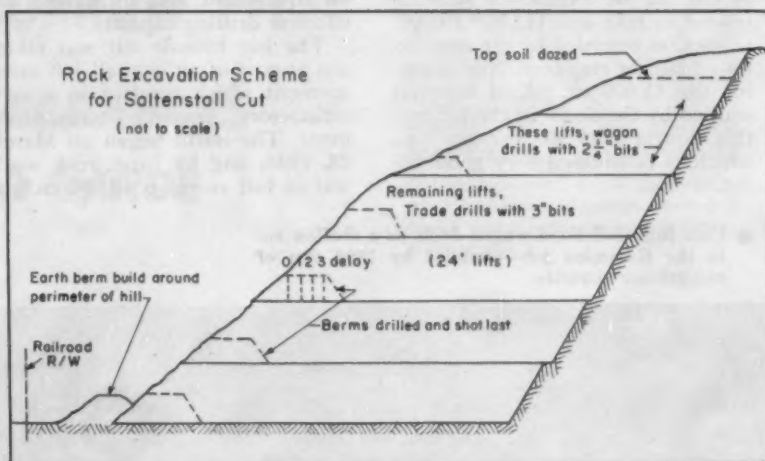
flying or rolling rock fragments from the blasting. The berm was kept at a height of one lift above the excavation, the berm varying from 25 to 50 ft. wide at the base or about one-fourth of the width of each lift floor.

The upper benches were drilled with wagon drills using $2\frac{1}{4}$ -in. bits (Timken and other makes). Holes were on a 5 x 5 or 6 x 6 ft. pattern producing about 1.3 cu. yd. of rock per ft. of hole. For the four lower lifts, the heavier Gardner-Denver Air Trac drills were brought in and used with 3-in. Brunner & Lay bits on a 7 x 7 or 8 x 8 ft. pattern which averaged about 2 to $2\frac{1}{4}$ cu. yd. per ft. of hole.

All blasting was done in millisecond delay patterns designed to insure a definite throw inward toward the bluff. After the inner three-fourths of the lift floor had been drilled and shot, the drill crew went back and took out the remaining outer prism, following the shovel as it moved through.

Berms were typically drilled with four rows along the axis of the

- The hill has been scalped (March 13, 1956) and a shovel and dozer have begun to cut a path up to the top to begin rock excavation.



- Sketch of scheme of excavation—simple but it did the trick.





● "Before and After"—How the Saltonstall cut looked on March 1, 1956, as work began, and how the cut appeared this past winter after completion.

work, and shot with a 0-1-2-3 delay pattern to throw into the pit toward the hill.

Shots as large as five tons were thus handled without any mishap or disturbance of rail traffic. The job was done with American 40% (1¼ x 12) for the wagon drills and DuPont No. 1 Gelex (2 x 16) for the Air-Trac equipment. Exactly 80,370 lb. of explosives was required to take out 143,959 cu. yd. of rock, as recorded by the contractor's blasting engineer. Not counting the 15,000 cu. yd. of material scalped by the dozer in the hilltop, this figures .558 lb. per cu. yd., which is considered very good going.

Gammino's compressor hook-up for this cut and other parts of the job typically included a 3,000 cu. ft. receiver tank and a length of 6-in. steel air pipe, with manifold and hose lines to the drills (see photo). The foremen considered the receiver-and-pipe arrangement to have the advantage of insuring a steadier pressure, thus saving wear and tear on equipment and increasing the effective drilling capacity.

The big hillside cut was taken out as part of an over-all job management which resulted in a very satisfactory season's accomplishment. The outfit began on March 28, 1956, and by June, rock work was in full swing at 10,000 cu. yd.

daily or better. Five shovels working in synchronization with the scrapers and other equipment, were able to move 580,000 cu. yd. of rock by mid-August. Working five 11-hour days per week, the shovel operators averaged about 200 cu. yd. per hour per shovel during the peak months of June and July. In one cut where there was relatively little slope clean-up work to slow down the production, a 3½-yd. P & H averaged over 300 cu. yd. of rock per hour. The Northwest 80D's made comparable runs in relation to their size.

Jack Ramos was general superintendent and Lou Garrity rock superintendent for the contract 319-01 project work, which is under the Connecticut state highway department, with Seelye, Stevenson, Value & Knecht serving as contract engineers on design and job supervision. William D. Bailey was project manager.

● Four Ingersoll-Rand wagon drills on a shallow cut in the Gammino job—supplied by 1800 cfm of compressor capacity.



Heavy Utility Relocation Cost for Connecticut Pike

An estimated \$5,837,000 will be required in relocating utilities along the 126-mile Connecticut Turnpike now under construction. Representing about 1.2 percent of the total cost of the project including financing and administration, this relocating effort is the largest and most complex of its kind ever involved in a highway project.

● At least 116 roadside safety parking areas are planned in a long-range program along New York state highways, doubling the number of existing areas of this kind. Legislative attention is being directed toward financing these facilities through park funds to help conserve highway money for new road construction.



BEAR IN THE BORROW PIT

THIS D9 LOADS SCRAPERS

WITH 25 HEAPED YARDS

IN 45 SECONDS



Phil Dudenhofer, grade superintendent, knows from production charts that the D9 pusher loads more yards faster, at lower cost.

Working on a highway relocation job near Eau Claire, Wis., L. G. Arnold, Inc., cut cycle times and boosted yardage with a Caterpillar D9 Tractor push-loading a CAT* DW21 and No. 470 Lowbowl Scraper.

On a round-trip haul of 3 miles they averaged 100 cu. yd. per hour — 4 heaped loads of 25 cu. yd. each. Loading time in the borrow pit, with the mighty D9 pushing, was an average of only 45 seconds.

Phil Dudenhofer, grade superintendent for L. G. Arnold, Inc., says: "I've got both feet right in the dirt, where I record output and performance of every machine. With the D9 as pusher, the DW21-No. 470 unit is outproducing by far any other equipment on the job."

That experience has been shared by hundreds of firms, as more and more D9 Tractors have gone to work all over the country. For fast loading you simply can't beat the D9, with its 320 HP at the fly-

wheel and maximum drawbar pull of 98,000 pounds. Power-boosted controls and excellent visibility make this giant one of the easiest of all tractors to operate. Available either with torque converter or direct drive with oil clutch. Maintenance is easy, too. And it's ruggedly built to lick the world's toughest jobs.

Your Caterpillar Dealer can show you actual performance records of bigger production at lower cost per yard. He'll give you a demonstration right on the job. And he stands behind the long life of every machine with reliable service and parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

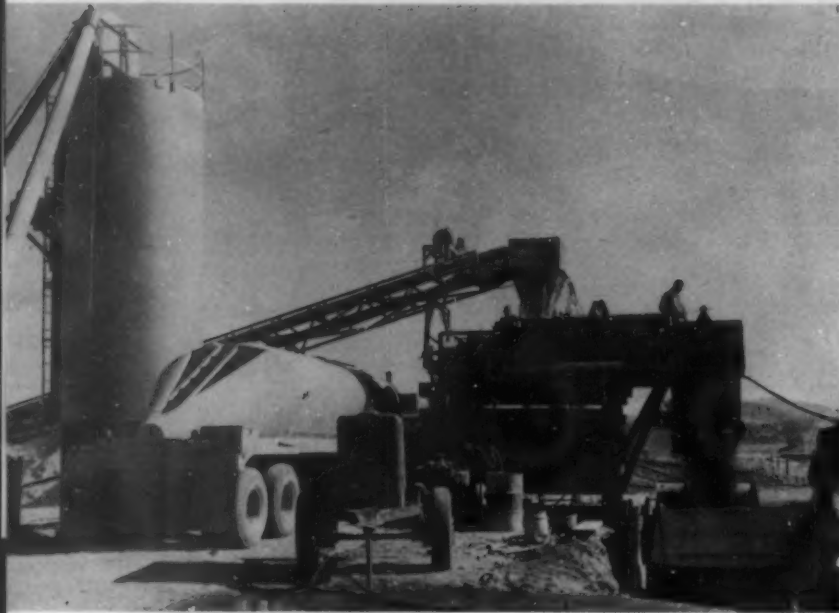
CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**HEAVY-DUTY EARTHMOVERS
FOR THE HARD WORK**

... for more details circle 218, page 16

Central Mix "Worked Out Fine" for



Central Plant Advantages Contractor preferred central plant, located midway of project, to provide closer job control and eliminate slow-downs when working in restricted interchange areas.

Close control of cement, moisture and mixing attained through use of pugmill type central plant for freeway project near Spokane.

TRAVEL plant or central mix for cement-treated base? This question occasioned some close figuring by McAttee and Heath and F. R. Hewitt Co., joint-venture contractors of Spokane, Washington, in deciding how to handle the base work on an expressway job near their home city.

Cement-treated base placed under 200,000 sq. yd. of pavement was part of a \$705,000 paving contract awarded to the joint firm in April of 1956. The job involved 5.11 miles of dual highway on U.S. 10 east of Spokane.

The decision to set up a central plant in lieu of the traditional "western-style" travel plant was due to a number of factors, each of which had to be carefully evaluated. Since the job had a rush tag on it, with a limit of 160 working days before penalties began, a prime consideration was not just the cost but the speed vs. cost of mixing and placing the base.

Windrowing the aggregate and mixing in place appeared to insure steady production of base to the extent that stockpiling would keep ahead of processing. Presumably a breakdown in aggregate production, or a condition

of the haul road which stopped the trucks, would be of short enough duration so that the stockpiled windrow would suffice to keep production rolling.

On the other hand, the opinion was expressed that a travel plant was hard to get into tight spots, such as the several interchanges and grade turnouts involved.

As to control of moisture and cement content arguments could be given for either the travel plant or central mix.

The choice of the central plant eventually centered about its advantages in utilizing production-line methods with large aggregate stockpiles offsetting the presumed advantage of windrowed stockpiles. The contractors felt that a properly constructed central plant would be no more likely to break down than would a travel plant. Their central plant would also incorporate carefully calibrated valves and controls, so that accurate control of moisture and cement quantities would be easy to maintain.

It was also anticipated that a versatile operation would result from be-



Mixer in Action Located on the right-of-way, the central plant is seen with diesel power plant at left and stockpiled aggregates being dozer-fed at right.

Cement-Treated Base Job

ing able to shift dump trucks from aggregate stockpiling to hauling base mix, or vice versa, as balance operation required. Since all hauling was to be on the freeway subgrade, there was little reason to expect bad haul road conditions. Spreading was to be by Jersey Spreader Box and compaction by Jackson Vibratory Compactor; it would be relatively easy to get this equipment and the dump trucks into the tight spots.

At the time the job was visited in August, 1956, there appeared to be every reason to believe that the contractor's choice was vindicated. The operation was smooth, precise and satisfactory as far as engineering tests could determine. The central plant was operating at full capacity, dump trucks were being constantly shifted from stockpiling to hauling mix, and there was no evidence of potential bottlenecks.

● **Engineering Design and Specifications.** This was one of the first cement-treated-base projects in eastern Washington. The specifications provided for a leveling course of 3-in. maximum crushed gravel of 2-in. thickness with which the contractor was required to bring the subbase to a close tolerance. The cement-treated-base was 8-in. thick and used 3/4 maximum screened aggregate. Curing called for an application of 0.15 gal. per sq. yd. of emulsified asphalt which also served as a prime coat for the 3-in. Type 1 asphaltic concrete pavement.

In offering the contractor a choice between mix-in-place from a windrow

and plant mix methods, the specifications allowed one hour in which to mix and lay the base and one hour thereafter to compact and finish out.

Other requirements of interest were that base compaction had to equal at least 95 percent of maximum and the moisture content had to be kept between 5% and 6 percent. Four percent by weight of cement was added. The surface tolerance of the cement-treated-base allowed a variation no greater than 1/8 in. in 10 ft. in any direction when tested with a straight edge.

● **Aggregate Production.** The base operation was unique in that it was literally conducted entirely within the fenced freeway right-of-way.

A Cedarapids portable crusher plant was set up almost on the freeway center-line near the east end of the project. The aggregate source was a large cut located on the freeway at its intersection with another highway. In this manner, the freeway excavation was also being accomplished while crushing progressed for base and paving aggregate.

A Cat D8 U dozer, working in the pit, shoved gravel onto the primary conveyor where it was delivered to a 36 x 40 jaw crusher. A scalping screen removed 3/4 minus material and delivered it directly to a bin from which it was taken to the cement-treated base plant.

All material passing the scalping screen was delivered to a 3-ft. cone crusher, after which it is again screened to remove 9/16 minus aggregate which was conveyed to the as-



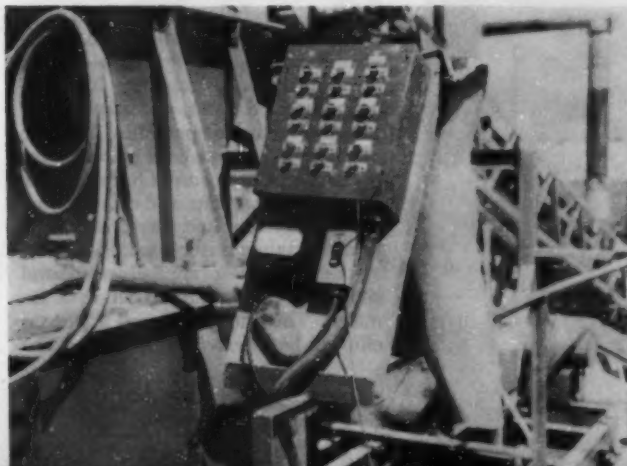
● Conveyor shown supplying blend sand, and cement feed from silo, both being discharged on main gravel conveyor.

phalitic concrete bin. The final operation delivered any remaining reject material to 20 x 40 rolls for 9/16 minus finishing.

The primary jaw was powered by a Cat D8 800, the cone by a Cat D8

Money-Saving Controls

At left: Central mixing plant, entirely electrified, was easily controlled with start-stop switches on this panel convenient to operator. At right: Air-operated discharge control of gob box on Barber-Greene pugmill.





Gravel on the R/W

Showing primary crusher end of plant. Cat D8 U dozer, while pushing gravel to crusher, was at same time excavating highway intersection area to grade.



Plenty of Capacity

Crushing and screening plant which produced base and paving aggregates at 300 tons per hour combined capacity.



tractor, the rolls by a GM Detroit Diesel model 6-110. A Cat D13000 generator supplied the motorized screens and belts. The contractors used a large trailer to house electrical con-

trols as well as their repair and maintenance equipment.

The above plant delivered a combined average 300 tons per hour of the two gradations of material. Close

control of the crusher operation resulted in aggregate which was very close to the middle of the specification for the two types.

Truck hauling was managed with idea that the crusher storage bins could take up aggregate production for short periods, as necessary to free trucks momentarily for a constant maximum delivery of base mix to the grade.

● **The Central Plant.** The central plant was built around a Barber-Greene mixer, set up along the right-of-way. The mixer included a gob box, hydraulically operated gates, water spray system and twin shaft pugmill. This type of mixer is without liner plates as the material being processed forms its own liner. The aggregate and cement were dry mixed about half way through the mixer and then water was added. The amount of water applied was hand controlled through a meter box at the mixer. This mixer required 75 hp of effort, which was furnished by a Cat

First the Leveling Course Roller compacting 2 in. leveling course ahead of the spreader box, this course a real job economy.



D364 173-KVA engine generator.

The mixer was fed by a 30-in. belt conveyor running from the crushed aggregate stockpile directly to the mixer. Since the aggregate was deficient in fines, it was necessary to utilize a blending sand stockpile. Blending sand was delivered to the main conveyor on a 24-in. conveyor belt. Cement from the adjacent silo was also delivered to the main conveyor at about the same point. The rate of delivery of the gravel and the sand were controlled by U.S. Syncro gear motors driving 9-ft. lengths of feeder conveyor connecting the aggregate hoppers to the conveyors.

Rather than raise the mixer and silo above ground level, the finished product was pit loaded into dump trucks. Bulk cement was delivered to the silo



by Fruehauf Norwester cement trailers.

● **Base Mix Control.** The success of the central plant method was largely attributed to the close control obtained in the rate of feed of the aggregate and cement. Dick Busch, Civil Engineering professor at Gonzaga University and summertime soils engineer for the Washington state highway department, spent considerable time carefully calibrating the aggregate, cement and water controls. The job was performed with such a degree of care that any desired result could be obtained by pre-determined valve or speed settings.

One of the advantages of the completely electrically operated plant showed up in the convenience of having start-stop switches on a control panel, handily located for use by the mixer operator. Any one of the many motors could be individually controlled. The panel also included a voltmeter showing the output of the engine generators as well as a buzzer which gave quick warning should the cement silo become empty or fail to feed properly.

The loading valves on the gob box

were operated by compressed air supplied by a Worthington model 126 compressor.

The first several days of operation of the mixer showed that its capacity would average between 350 and 360 tons per hour. A Hobart 300 amp portable electric welder stood by at the plant for quick repairs.

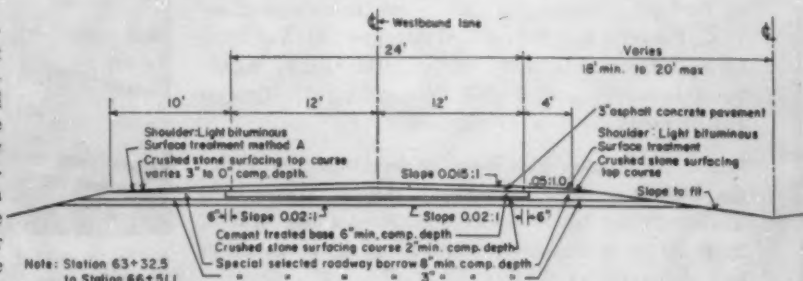
● **Base Spreading and Finishing.** The contract contained an item for a leveling course which facilitated bringing the subgrade to within a close tolerance. Considerable effort was made to

Spreading and Compacting

Jersey spreader pushed by Cat D8 placing loose lift of cement treated mix, followed by Jackson vibrator, Cat 2 grader, and (in far distance) water wagon and Galion Roll-O-Matic steel wheel roller. H. W. Humphres, soils engineer, seen in one of the pictures.

finish the leveling course as close to grade as was possible in view of the manner in which the cement-treated-base was spread. Motor graders spread crushed aggregate, which was then compacted by a 10-ton Huber-Warco steel wheel roller.

The base mix hauling, with hauls up to 2½ miles, generally required about 15 trucks, most of which had 4-yd. dump bodies. The trucks turned around on the grade and backed up to a Jersey spreader (pushed by a Cat D8 dozer). The required loose spread for 6 in. compacted thickness was checked frequently by the spreader box operator, using a measuring stick. It appeared very easy to regulate the box from time to time to maintain the correct thickness. The pushing dozer worked on top of the spread material



● Typical half cross-section of base, paving and shoulders for the freeway project near Spokane.

Tests for Base Quality on Freeway Project—

The Washington state highway department maintained a test crew on the project under the supervision of A. P. Sinclair, district materials engineer. Dick Busch was chief field representative in charge of actual test procedure. Two standard tests were performed. The first determined field density. The second involved preparation of test cylinders for 7-day crushing-strength tests.

Field density was determined from samples of the compacted base taken after it had been compacted, bladed and finish rolled. The use of a Washington State Densometer gave an accurate volume of the hole from which the sample was removed. This volume together with the weight of the sample allowed computation of the wet density.

In preparation of cylinders for the crushing test, a sample was taken of the cement-treated base immediately behind the Jersey spreader. Enough of this material was measured out to make a 4 x 4 in. cylinder. This portion was then split into two parts in the soil splitter. The first half was tamped into the mold using 50 blows of the hammer and the second half using 100 blows. The sample in the mold was then compressed to an ultimate load of 25,000 lb. at the rate of one minute for the first 20,000 lb., and $\frac{1}{2}$ minute from 20,000 to 25,000 lb. The 25,000 lb. load was held for 1 minute after which the cylinder was removed, weighed, and its height accurately measured. This allowed a determination of its maximum wet density. The cylinders were then sealed and placed in a moisture cabinet. After 7 days they were capped and tested to determine their crushing strength.

All compaction test up to late summer had exceeded 95 percent and were running in the neighborhood of 97 percent. Crushing strengths varied from 880 to 1250 psi, averaging about 1100 psi.

The major items of equipment used in these tests on the job were: 1). 36-lb. capacity Jacobs scales graduated to .01 lb; 2). Washington Densometer manufactured by D. G. Parrott & Son, Olympia, Washington; 3). Soil Splitter manufactured by Soil Test, Inc., Chicago; 4). Blackhawk hydraulic jack, 50,000 lb. capacity; 5). Federal Extensometer (.001-in. graduations).

The Washington state highway department strives for the highest possible wet density through compaction. Their tests and experience have indicated a drop of from 20 to 70 psi in crushing strength for each one pound in loss of density per cu. ft.



● Field density was determined at frequent intervals utilizing Washington State Densometer to determine volume of sample.



● Samples of cement-treated base were taken immediately behind the spreader for determining wet and dry density and crushing strength. Inspector is tamping sample into mold, assistant prepares another sample in soil splitter.



● 4-in. diameter cylinder is subjected to 25,000 lb. compression load.

Washington State Method



● Inspector removes split cover on mold, revealing sample cylinder.



● Compacted sample is weighed in wind-protecting box.



● Extensometer (.001 in. grad.) was used to determine cylinder height. Cylinders were crushed after 7-day curing period, with strengths from 880 to 250 psi.

immediately behind the box without any apparent ill effect.

The spreader box was followed immediately by a Jackson electric vibratory multiple compactor which in this instance had one section removed. The reduced width of the vibrator was used, as this width worked out better for the 12.5 ft. width of base being laid. It was found that three passes with the vibrator and finish-rolling with a Galion tandem gave a compaction somewhat exceeding the 95% required.

The contractor maintained two Cat No. 12 graders on the job, one kept busy loading behind the vibrator, working with the tandem roller to produce an even surface to the base. The other spread the leveling course and shaped the shoulder. The cement-treated base was not laid "in a trench"; instead, the shoulder material was bladed up against the base material after it was laid, but prior to vibratory compacting.

Due to the strictness of the specifications in regard to time elapse between mixing cement-treated material and finishing out, the contractor adopted a policy of allowing no noon-hour break. All employees ate their lunch on the go. This practice seemed to cause no serious objection and had the advantage of speeding up over-all production.

After the motor graders and steel rollers had finished with the surface, the base was continually sprinkled with a fog-type nozzle from a water wagon, which was a Sterling 3M pump. The fog-type spray maintained the proper moisture content without disrupting the surface of the base. As soon as a reasonable length of base had been finished, usually from 600 to 1,000 ft., emulsified asphalt curing cover was applied from a 1,250 gal. Etnyre distributor mounted on a Federal 45 M truck. At this point, the base was considered finished except for curing.

● **Personnel.** Dave Heimbinger was superintendent for McAtee and Heathe, Harold Haneke was superintendent for F. R. Hewitt Co. Representing the Washington state highway department district office were: R. B. Leary, resident engineer; Norm McCutchen, head inspector; Dick Busch, soils engineer; Ray Jones, inspector and Don Jones, assistant.

Bid Price for Cement Treated Base

(6-inch compacted thickness base, bid items converted to square-yard basis)

Cement-treated base—materials in place, mixed, placed and compacted	0.19
C. T. B. aggregates (screened gravel 1 in. minus) ...	0.249
Fine sand (blending with C.T.B. aggregates)	0.138
Cement (4%)	0.356
Curing compound for C.T.B. (SS-1)	0.058

Cement treated base—per sq. yd.	0.991
3 in. asphaltic concrete surfacing (\$5.80 per ton) ...	0.965

Total pavement cost per sq. yd. 1.956

Gradation Requirement for C.T.B. Aggregates

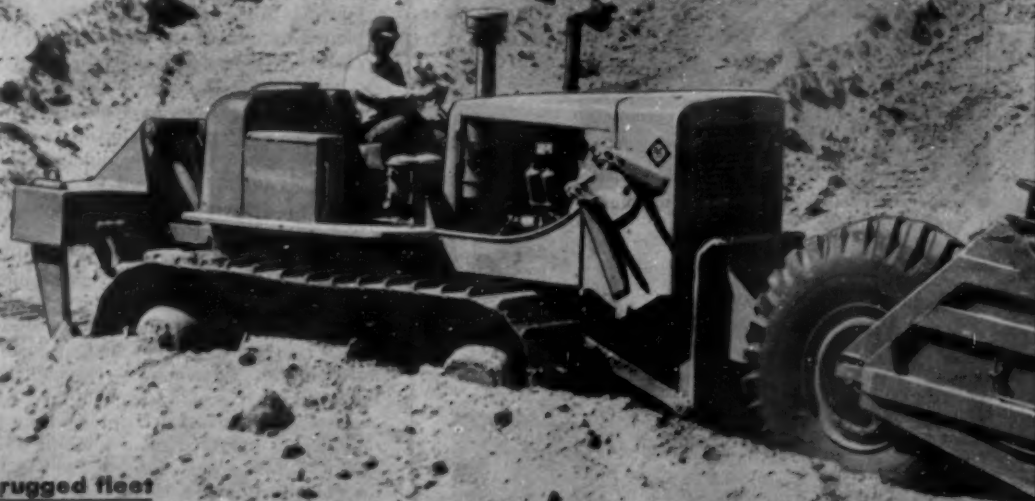
Passing	% by Weight
1 in. (sq.)	100
¾ in.	90 to 100
½ in.	65 to 90
¼ in.	50 to 80
No. 4	40 to 75
No. 10	30 to 60
No. 40	13 to 36
No. 200	3 to 15

time: spring 1956 to spring 1957

place: foothills of Colorado Rockies, site of new Air Force Academy

job: move over 4 million yards of murderously abrasive material... plus 400,000 yards of boulders; make cuts up to 60 feet deep... handle 20-yd loads on grades up to 8 percent... hauls up to a mile long

schedule: around-the-clock



Backbone of a rugged fleet:

HD-21's (207 hp) and TS-360's (20 yd heaped).

YEAR'S TOUGHEST MOTOR SCRAPER JOB

Cutting as deep as 60 feet into abrasive dirt and boulder-ridden clay, this fleet of Allis-Chalmers machines accomplished what was one of the toughest jobs handled "on rubber" in the past year.

Tough grades, long hauls were part of every cycle on this Colorado Rockies job... but TS-360's consistently moved 20-yd loads fast on haul roads maintained by big Allis-Chalmers Forty Five motor graders.





— NOW COMPLETED ...

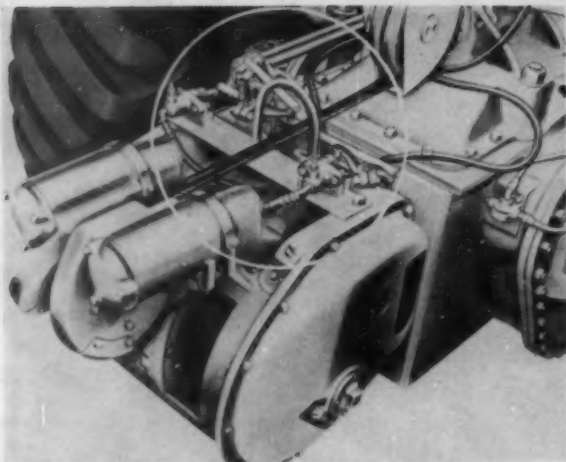
with Allis-Chalmers construction machinery

A more severe test of modern, high-speed earth-moving methods and equipment than this Air Force Academy job would have been hard to devise. Big performance, rugged dependability . . . easy operation . . . simplified lubrication and service made Allis-Chalmers the choice at the start. Now, in spite of rugged operating conditions, that choice has been justified in a job well done. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

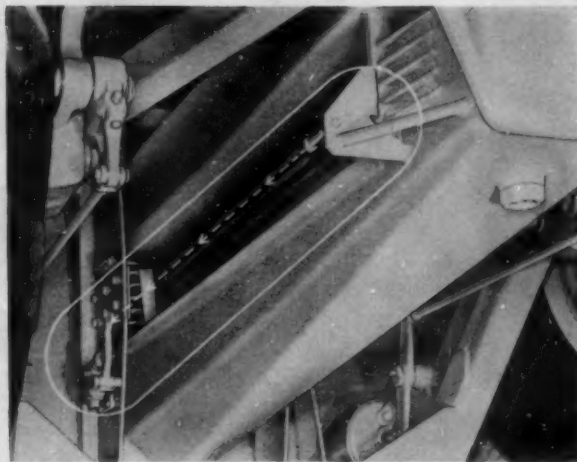
ALLIS-CHALMERS

. . . for more details circle 201, page 16
ROADS AND STREETS, April, 1957

Engineering in Action



● The slave cylinders, located on top of the cable control housing, are actuated by master cylinders and force the cable control lever to the hold position when the ejector and bowl approach their limits of travel.



● The bowl master cylinder, located on the gooseneck near the upper nest of bowl lift sheaves, actuates a slave cylinder, and forces the cable control lever to hold position when the bowl approaches its limit of travel.

How to Extend Life of Cables

By M. W. DARGEL

Assistant Manager, Service Department, Caterpillar Tractor Co., Peoria, Illinois

DON'T let cable breakage cost you time and money. Cable is normally considered an expendable part of a scraper or cable controlled bulldozer. However, as with most expendable items, it is only natural to try to extend its usable life and this can only be accomplished by good maintenance practices and a good operator.

In most cases, an experienced operator can just about predict the length of time the cable will operate before replacement will be necessary. He knows that cable breakage and "down time" can be reduced to a minimum by correct operation of the cable control and daily inspections of the cable at the most common points of cable breakage.

1. The first place the experienced operator will check for cable wear is at the cable drum. Wear occurs more rapidly here because of the overlapping or "wiping" action of the cable as it wraps around the drum. The wiping action of the cable causes the cable to fray and frayed sections or kinks in a cable are the points at which a cable is most likely to break. However, if kinked cable is discovered during the daily inspection, the kink can often be straightened before the cable is too severely damaged. Kinking, of course, is caused by improper

operation of the cable control which in most cases can be attributed to faulty adjustment of the cable control clutch and brake. Incorrect adjustment of these will allow excess cable to unwind from the drum.

2. Frayed cable is often the result of a bent or misaligned sheave, or a sheave or ejector roller that is binding or not turning freely. Sheaves and rollers require lubrication to keep them rotating freely so that the cable does not slide on the sheave.

3. After installing new cable on a scraper, make sure that there is approximately two wraps of ejector-apron cable on the cable control drum when the scraper ejector is at the extreme rear position with the apron down. Also, with the bowl at ground level there should be five to six wraps of cable on the drum.

4. Where a drum is used to control a bulldozer, allow sufficient cable for at least four wraps around the drum when the blade is at ground level.

5. When lowering the scraper bowl to the ground or when setting the cutting edge for digging, do it with a positive action keeping the cable under tension.

6. The ejector will normally move the material out of the scraper rapidly. However, don't overstress the cable when moving sticky gumbo material.

It's normal for some dirt to "hang up" on the cutting edge when unloading the scraper. The ejector can't go far enough forward to push it off. So, again, don't overstress the cable.

7. As the apron is forced upward by the dozing action of the dirt when the bowl is being filled, take up the slack in the cable and then let out enough cable to adjust the position of the apron.

8. Keep the cable control brake engaged while moving to the dumping area, and to the cut, to keep cable from "free spooling."

9. Undoubtedly, there are many more "tips" that could be offered to extend the life of scraper cables and probably a great number to extend the life of cable for cable controlled dozers, but they all add up to the fact that long life is built into a cable and it's up to the operator to extend that life to its usable limits.

10. To aid the operator in extending the life of cable, a "cable saver" has been made available on some scraper units. Basically, the cable saver consists of a master cylinder and a slave cylinder, connected hydraulically. The master cylinder for the ejector cable is located at the forward end of the ejector track and the master cylinder for the bowl lift cable is located on the gooseneck near the upper nest of bowl lift sheaves. Both slave cylinders are located on top of the cable control housing.

Home-Made Equipment vs. Factory Models

In recent issues of this publication readers have reported a variety of mechanical units which have been developed by the city's shop and maintenance personnel, in lieu of purchasing commercially available units of a similar nature.

This practice always raises interesting thoughts in our minds. Is the home-made unit better than any on the market? If so, possibly some enterprising manufacturer will soon take it over—that is, if the machine is of a type widely enough applicable to make it a mass-production item.

It is this very thing—the united effort of the man who needs a better machine and tries to devise one, and the manufacturer looking for opportunities—that has brought about the amazing mechanical revolution in highway and street construction and maintenance. This evolution, clearly, is still going strong.

The manufacturer, conversely, when he develops a new machine or a new model, usually places it out in service so that the user—the real “equipment designer” in the long run—can help ferret out the bugs. Thus the manufacturer can finally offer the field the best possible machine. Once this is done, under the American system of private enterprise and mass-production, the result is usually not only a better, more efficient and productive machine than any municipal agency can build for itself, but also a lower priced one.

When is the home-made machine a better deal than the factory-produced unit? Municipal leaders should not discourage mechanical initiative and ingenuity shown by shop and maintenance men. But there is the danger here of perpetuating a degree of self-kidding, of failing to make a full comparison of all cost and productivity elements.

A contractor who knows his equipment economics will quickly tell you that nobody who performs work with equipment—at least no private contractor—can afford to

have anything but the most efficient machine today, or the right machine for the job. And he'll tell you also that purchase price is usually a secondary consideration to productivity and job efficiency, and that the chief management job is to plan operations so that machines are kept constantly busy.

Briefly Noted

Charles M. Noble, perhaps the No. 1 turnpike engineer, has gone back into the fold of state highway work after seven years' work steering the gigantic New Jersey Turnpike undertaking. Roads and Streets wishes him well as he sits at the Ohio top desk. This job has been held down briefly by a succession of capable men, as the political winds have blown from this direction and that.

Ohio was the scene of brilliant accomplishment in both volume and progressiveness of highway engineering work under S. O. Linzell, Noble's immediate predecessor. It is hoped that Ohio's Legislature can find a way to keep a capable man in office along with his entire first-string staff, on a merit system rather than political hire-and-fire basis which is so disruptive and costly to the taxpayer.

Out of all the ideas advanced to help develop new engineers, none seems more practical than that described by Rex Whitton, chief engineer in Missouri. Speaking at the winter meeting of ASCE at Jackson, Mississippi, he told how his department's personnel men have invaded the high schools to interest young men in taking summer jobs with the staff. Each year the Missouri department intends to sponsor attendance of high school graduates at state engineering schools; about 40 such students are currently enrolled.

Widening, strengthening or replacing small bridges constitutes one of our most serious problems. So reminds Professor Ben Petty of Purdue University. Speaking at the annual Wisconsin Road School recently, he pointed to the existence of thousands of narrow, weakened, poorly aligned and generally inadequate bridges and culverts, adding that “they continue to stand up only by the grace of God and the force of habit.”

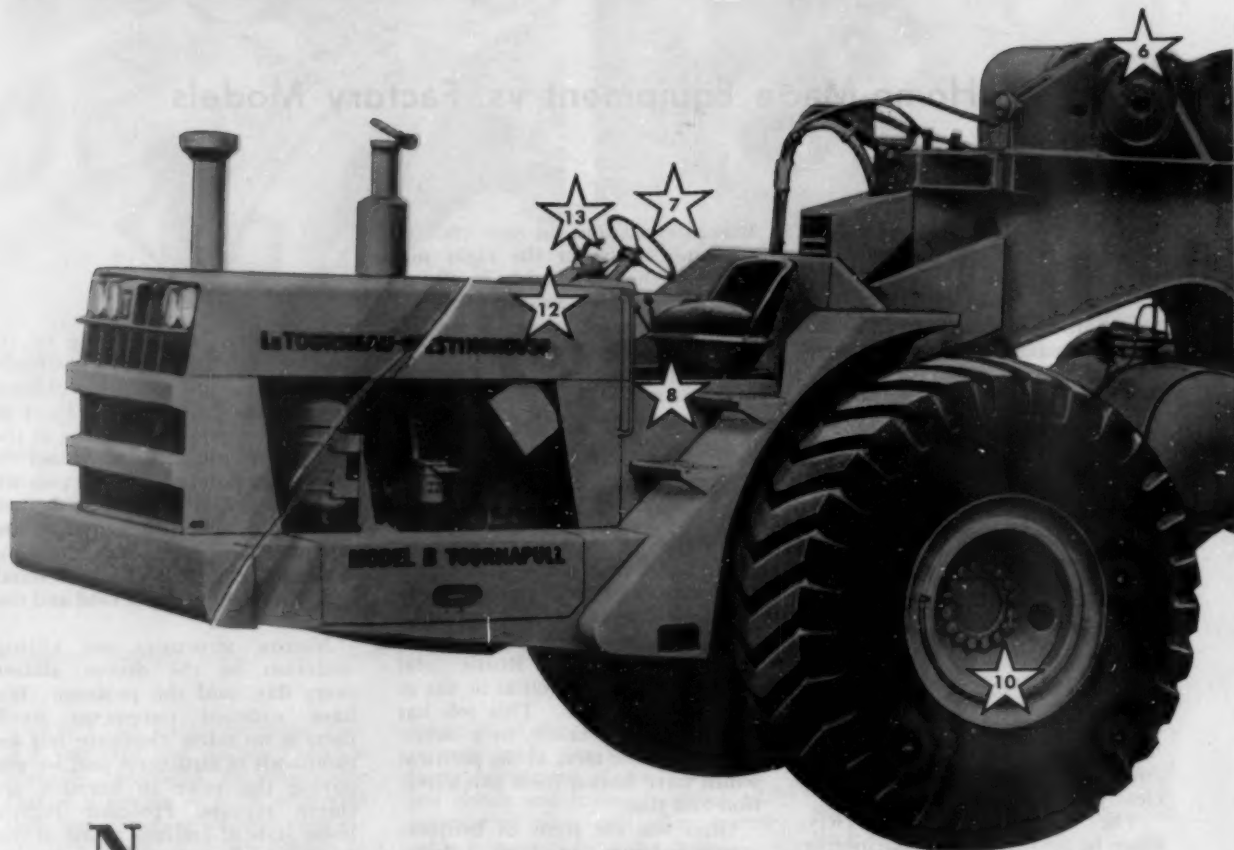
Narrow structures are killing motorists by the dozens almost every day, said the professor. We have widened pavements until there is no safety clearance left on thousands of structures and we are paying the price in horrible accident reports. Professor Petty's home state of Indiana is one of the states which is finally starting to make inroads on this huge problem.

Who is finally responsible for the success of our highway program? Speaking at a recent convention, Arthur C. Butler, Director of the National Highway Users Conference, puts it straight as follows:

“Much of the long-range battle is, of course, the responsibility of the states. But the term state responsibility is deceptive because it gives us a mental picture of a state capitol dome, or maybe a big desk and back of it a highway commissioner without a face. What we should see instead is people. And not just highway officials, at that. Along with the officials, we should see state legislators. And we should see, with special clarity, highway users.

“Here—group by group and man by man—is where the responsibility lies, in large measure, for the success of the biggest public works program of all time.”

NEW B Tournapull



New, low, wide B Fullpak scraper gets *big loads fast!* This tested design is fully proven for fast and easy loading — has been in world-wide service for over a year on the modern 18-yd. Model C Tournapull. This companion 27-yard Fullpak loads just as easy and heaps just as fast. Check it against any of today's big production units. Compare it for lowest-net-cost-per-yard.

Loads faster...boils better... offers many advantages:

The "low and wide" design of the new B Fullpak scraper gets full-capacity, low-void pay-loads fast. Side-sheets curve up in center to reduce spillage and deflect material into corners of apron and tailgate. Tailgate has a curved top to roll material into the heap, fill all corners. High, deeply curved apron adds dirt capacity and carries a big part of load forward in its "belly", for better weight distribution, lower center of gravity, and improved stability on any terrain.

Low push-block gives direct-line application of power from pusher to blade. Bowl bottom has only 1" rise. In loading, dirt flow is nearly horizontal — big loads pack in fast.

Powerful, improved 293 hp Model B Tournapull prime-mover has the famous L-W power-transfer differential that keeps pulling-traction on both drive wheels at all times. Power-steer through geared king-pin permits 90° turns. This positive king-pin steer permits swinging prime-mover to let drive wheels find better footing and "walk" out of mud and loose sand.

Push-button electric control and wheel-operated electric steer make handling easy. All-weather electric motors at points of action give instant steering and scraper control.

Heavy-duty transmission provides ten gear ratios, from 2.6 to 28.4 mph. Low gear matches pusher speed, enables "B" to help itself in loading, gives full lugging power for pulling through soft footing. This combination of 10 speeds, plus clutch-brake for fast shifting, means hauling at higher speeds... more pay-yards per hour.

For full details on this new 27-yd. B Tournapull, see your LeTourneau-Westinghouse Distributor. Analyze your earthmoving requirements. See how this BIG "B" with new *fast-loading* Fullpak scraper can earn big dividends for you on future work.



Tournatractors



Rear-Dumps



Adams Graders



Adams TravelLoaders

Bottom-Dumps, Cranes, Flat-Beds, Elagraders, Rollers, Snow-Plows, Logging Archers, Scrapers, PCU's, Roosters, Root Rakes, Wire Reps.

with 27-yd. FULLPAK scraper

1. Low, wide Fullpak scraper: 27-cu. yds. heaped, 19.1-cu. yds. struck, 32.5 tons.
2. High-lift apron. Big opening (7'1" high x 10') makes sure anything that goes in will come out!
3. Deflectors on yoke arms, and smooth, wide apron side-arms, prevent trapping of rocks, and other chunky materials that might slow up operations and involve manual clearing.
4. Curved deflector on tailgate rolls dirt into center of bowl for bigger pay-load.
5. Streamlined bowl has no obstructions to interfere with bailing flow of material.
6. Large diameter cable-drum on apron-hoist permits fast spooling without kinking, increases rope life.
7. Power steering wheel gives easy handling through positive electric control.
8. Cockpit is raised to give operator clear visibility. He can see both load and pusher at all times.
9. Scraper wheels are easily removed, and interchangeable with wheels on prime-mover. Outboard bearings give stable load support.
10. Multiple-disc air brakes, and sturdy brake elements, give quick stopping power, longer service.
11. Heavy cross-tube ties side sheets rigidly together on low, wide Fullpak bowl.
12. Constant voltage transformer provides accurate control at low engine RPM.
13. Quick-release clutch and fast electric-hoist allow rapid bowl "pumping".
14. Large push-plate, of all-welded, reinforced box-type construction, provides big pusher target, keeps contact over uneven terrain.



Brief Specifications for New B Fullpak Tournapull:

Capacity: Tons32.5
Heaped, cu. yds.27
Struck, cu. yds.19.1

Power: 293 HP Cummins Diesel

Tires (Std.): Four 27 x 33—30-ply rating

Speeds: Ten forward 2.6 to 28.4 MPH
Two reverse 2.4 to 3.5 MPH

Turning Angle: 90° left or right

Width Required for 180° Turn: 39'10"

Control: Fingertip Electric

Brakes: Multiple-disc air brakes with 6552 sq. in. of braking surface

Dimensions:

Length44'0"
Width11'8 1/2"
Height12'2 3/4"
Wheelbase26'10"

Shipping Weight (approx. lbs.)68,900
(Specifications subject to change without notice.)



High-lift apron — positive ejection: Apron opens 7'1" to speed loading and unloading. Positive forward ejection of load wipes bowl clean of all materials, including mud and sticky clay. Low, wide bowl permits bigger heap, gives low center of gravity, provides greater stability in all working conditions. Smooth, wide side-arms and side-sheets of apron will not trap chunky materials that might hinder loading and unloading operations.



Low, wide bowl — heaps full-capacity, low-void pay-loads fast. Inside bowl is smooth, streamlined — has no reinforcement ribs to hinder dirt movement. Low push-block gives direct-line application of power from pusher to blade. Quick-release clutch, and fast, electric hoist, make possible rapid "pumping" of bowl for speedy loading of loose materials. Wheels inside cutting edge aid in precision grading, permit cutting against bank.

Tournatractor, Tournapull—Trademark Reg. U.S. Pat. Off. BP-1388-G; Fullpak, Adams—Trademark

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company



... for more details circle 262, page 16

Where quality is a habit

NORTH ATLANTIC HIGHWAY MEETING

Girding for Big R/W Task

Highway departments must take a new look at their right-of-way procedures, Henry J. Kaltenbach told AHONAS officials at the recent Atlantic City meeting. Among his specific recommendations were the following pertinent points, related here in detail because of the importance of right-of-way work as a preliminary to getting jobs to the contract-letting stage.

THE EFFECTS of the federal-aid highway program on state highway department operation was a major topic of discussion at the annual meeting of the Association of State Highway Officials of the North Atlantic States.

More than 900 highway engineers met in Atlantic City last month to air their views and exchange experiences under the first year of the accelerated National Highway Program. In two fields, particularly, the officials heard, the big boost in roadbuilding is forcing a re-evaluation of traditional practices—those of right-of-way acquisition and highway law.

Henry J. Kaltenbach, recently retired as Solicitor of the Bureau of Public Roads, told the assembly that the traditional right-of-way acquisition operation of state highway departments must be streamlined considerably if land is to be acquired fast enough for the new construction projects approved. The impact of the federal highway program will be felt in the following ways:

- Right-of-way departments will be thrown into the spotlight of public attention. Because of the increasing cost of land and the increasing frequency of damage suits, right-of-way operations will become far more newsworthy than ever before. It will require more than \$5 billion for land upon which to locate the National System of Interstate and Defense Highways, Mr. Kaltenbach said. In many areas, right-of-way

will come to 50% of the total cost of a project.

- The federal government will move into right-of-way acquisition to a greater degree than ever before. Up till last year, Mr. Kaltenbach said, only about two-thirds of the states had requested federal participation in their right-of-way costs. With Uncle Sam authorized to contribute 90% of the cost of property purchase for the Interstate System, all of the states will be acquiring right-of-way under Bureau regulations," he pointed out. For the first time, the BPR is assigning right-of-way agents in every state and officials must learn to work together closely and harmoniously.

- Modern highway design, calling for controlled access, wide right-of-way and large interchange areas will damage property far more than did the roads of an earlier era, posing the threat of louder protestations from property owners. Farmers will be severely damaged, business proprietors will be forced to quit their businesses or substantially change them. And the state and federal government must be prepared to pay for these substantial changes.

Mr. Kaltenbach questioned whether state highway departments are really facing up to these serious problems. He recommended a number of steps that officials should take to move their right-of-way divisions as far ahead of the construction divisions as possible:

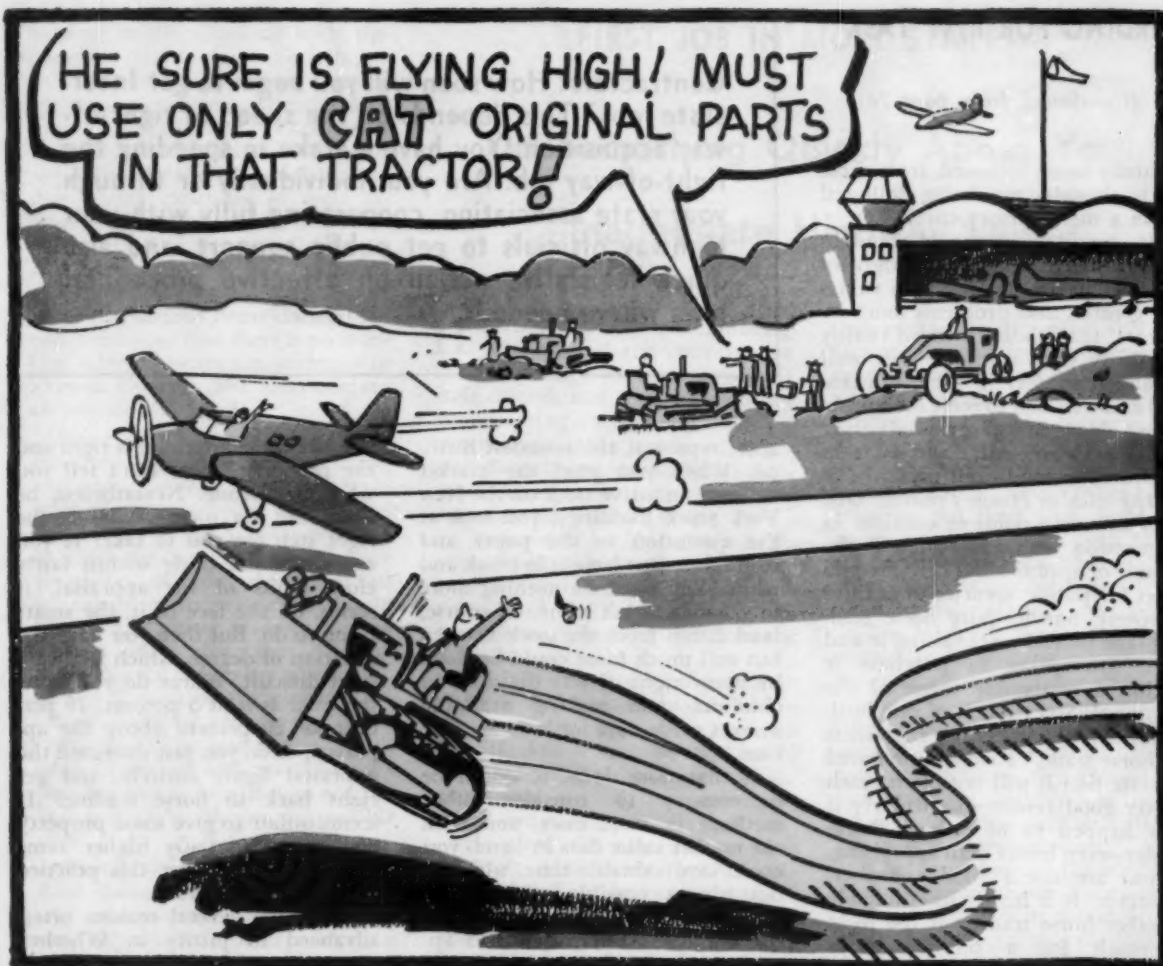
- Make a conscientious review of the adequacy of this department.
- Keep the public informed of your plans, particularly the property owners whose land lies in the path of the proposed highway.
- Step up acquisition of land for future projects just as quickly as possible to avoid high costs and the danger of public criticism, and
- Establish closer liaison between the right-of-way and the engineering divisions.

Following are detailed excerpts from Mr. Kaltenbach's Atlantic City convention paper:

THE FIRST question that comes to mind is whether a recent review has been made to ascertain if the right-of-way division has been geared to meet the impact of the Act with all of its implications. How long ago was a thorough review made of the entire operations of this division?

The new importance of right-of-way, as well as Bureau regulations, makes it clear that in most cases the procedures and practices of twenty or thirty years ago need review and development in order to meet the new conditions. If you have made such a review fairly recently, have you studied the particular questions raised by modern highway design, such as the correct measure of damages in cases of impairment of access or landlocked parcels, and adopted sound policies to solve them? By review, I mean a thorough one encompassing a spot check of files, field trips, and conversations with the men who are actually doing the job. Such a review will often turn up differences in the procedures and practices

(Continued on page 78)

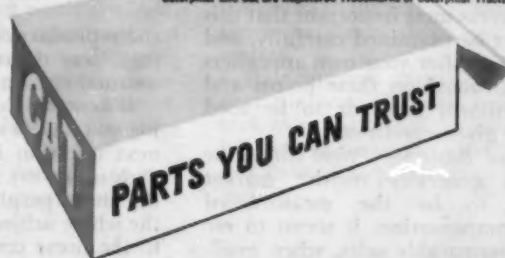


Are you aware of the **BIG THREE** in CAT® bellows seals for idlers, track rollers and final drive? You get special, long-lasting **FACING MATERIAL**... with just the right amount of **CONTACT PRESSURE** at the mating surfaces... and **AUTOMATIC ALIGNMENT** to keep facings flush and to compensate for wear. Each **BIG THREE** feature was developed and proved best for Cat-built Tractors. If it's a "look-alike" seal, who knows? Be sure to get parts you can trust—from your Caterpillar Dealer. He always has *exactly* the part you need.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



GIRDING FOR R/W TASK

(Continued from page 76)

actually being followed, from those it is thought are being followed from a mere cursory check.

It should be borne in mind in this connection, that your right of way agents are dealing with values far greater, and problems more intricate, than those involved twenty or thirty years ago. Are they well qualified to deal in these substantial amounts and to solve such problems? Have you reviewed their salary scale recently, and is it as adequate as conditions permit?

Appraisal or Horse-Trading? One very necessary point to consider in connection with any review is the matter of appraisals. There are two ways for public agencies to acquire property—one by pure horse trading—the other by appraising it and then attempting to purchase it within a reasonable range of the appraisal. Since much of our business life really in essence represents a "horse trade," I am not prepared to state that it will not often reach pretty good results—particularly if you happen to be a good horse trader—even better than appraising, if you are not a good appraiser. However, it is highly questionable whether horse trading is the right approach for a public agency spending public funds, presumably in an equitable manner, so that all property owners (where possible) are treated substantially alike.

Assuming you do not rely on horse trading, appraisals seem the only alternative. In fact, they are required by the Bureau of Public Roads and must be completed prior to negotiation. It seems to me essential to make every effort to get top appraisers or at least a few on your staff. The appraisers are not agreed among themselves on a uniform method of valuation in land acquisition cases. They are not always as well informed on compensable and non-compensable items as they might be. They do not emphasize benefits as much as seems advisable.

It seems most important that this subject be examined carefully, and that thereafter your own appraisers be instructed on these points and on uniform methods to be used under given conditions.

What Basis for Price? Since the courts generally require market value to be the measure of just compensation, it seems to me that comparable sales, when avail-

Contractors: How soon will you begin to get Interstate jobs? This depends on the speed of right-of-way acquisition. You have a stake in speeding the right-of-way job. Are you, individually or through your state association, cooperating fully with your highway officials to get public support, and also quick legislative action on effective procedural laws where needed?

able, represent the soundest method. When you want the market value of an active stock on the New York Stock Exchange, you look at the quotation in the paper and stop there. You have it in black and white. You need do nothing more to get the market value. Of course, land differs from the stock market, but still much more could be done by many right of way divisions in obtaining and making available market value data for land acquisition.

If that were done, it would be unnecessary to consider other methods in most cases, and with the market value data in hand, you could save valuable time, which is not always possible under some other methods. I think closer liaison between your association and appraisers' associations might be of great assistance in working out a sound appraisal approach. In my opinion, the practice often encountered today of taking the market value of the land and adding to it

you think the appraisal is right and the property owner can't tell you why it is wrong. Nevertheless, he holds out for more. What is the right step for you to take? If you can make the trade within fairly close limits of the appraisal, it seems, on the face of it, the smart thing to do. But then you have the question of degree, which is always most difficult. Where do you draw the line? Is it at 5 percent, 10 percent, or 20 percent above the appraisal, or do you just disregard the appraisal figure entirely, and get right back to horse trading? It seems unfair to give some property owners substantially higher sums than others, and yet this practice exists in some states.

There are several reasons often advanced to justify it. Whether these will satisfy the Bureau is not clear. Speed is usually deemed essential. Condemnation is frequently avoided because of the high verdicts. There is no question but that verdicts are high. In some areas it has been claimed that lawyers are going to property owners and offering to take their cases for one-third of the difference between the State offer and what is finally collected in court. I do not know whether such claims are founded on fact. I do know that there is often an amazing difference between the evidence of value offered by the state and the property owner.

If there are any evidences of this sort of thing in your state, then you might attempt to get together both with the local bar association and the local appraisers' association. If this does not prove of any assistance, then you may find that one of the ideas expressed above—unassailable market value data which establishes a base for fair appraisals and uniform treatment of all property owners—may be of help.

How to Soften the Blow. Another angle along the same general line

"The cities are pushing the country further and further back. Certainly this constantly boosts land values up and up. The only possible way to beat it is to acquire as much right-of-way as possible now."

the reproduction cost of the buildings, less depreciation, except in unusual circumstances, is unsound.

Where to Compromise? Assuming you have a sound appraisal, the next question is what do you do with it. To my mind, this is one of the most perplexing questions in the whole subject. It gets right back to the horse trading idea. Suppose

is your public relations with the property owners. It certainly helps to make sure that your right of way agents are courteous, friendly and cooperative when they deal with the property owners. They should not only be this on the surface, but they should also be so well informed of the reasons for the location of the highway; exactly how it affects the property; and the rights of the property owners with respect to all the various items claimed for compensation; that there is no question which they are not prepared to answer. Good public relations are clearly most helpful.

Work Ahead. Another point to consider is whether you are doing everything in your power to obtain right-of-way promptly as possible. Section 110 of the Act was designed to assist the States in the advance acquisition of rights of way and full advantage of its provisions should be taken. Barring a severe depression, it seems clear that development around urban areas will continue. The cities are pushing the country further and further back. Certainly this constantly boosts land values up and up. The only possible way to beat it is to acquire as much right of way as possible now.

Prestige of Right-of-Way Agent. Real liaison between the right of way and engineering divisions is very important. This depends on a number of factors; such as the position of the right-of-way division in the highway department; the personnel involved; their attitude towards its importance; and so forth. It seems to me that the days when right-of-way was an unimportant matter and could be ordered to be acquired at the last minute should be over. Forward planning and adequate lead times are just as essential for right of way as for engineering. This can only be accomplished by close and intelligent cooperation between the two divisions.

Such cooperation may also be of assistance in connection with the location of the highway. The familiarity of the right of way division with real estate and real estate values, particularly in urban projects, should be most helpful to the design engineer.

The right-of-way division is the logical one to deal with the planning officials, and to be familiar with the zoning ordinances. It should know the best industrial sites, and consult with the design engineer so as to preserve them.

FIRST JOB IN MOST STATES—

Do Something Quickly About Your Inadequate Highway Laws

HUNDREDS of roadbuilding jobs around the country can be hamstrung on legal issues, if state officials and legislators do not start clearing away the maze of inconsistencies that surround highway department administration, a national legal authority told the engineers at Atlantic City.

"You can't build today's highways under the framework of yesterday's laws," Louis R. Morony, director of the Automotive Safety Foundation's laws division, told the officials.

"As a lawyer, I recognize that in order to do this job, you must have adequate and up-to-date legal authority. And it must be the kind of law that will keep the highway departments out of the courts and avoid unnecessary delays."

He cited the case of one state highway department the Automotive Safety Foundation has studied, which operated under the conflicting dictates of 102 public acts and 1,000 legislative acts, some in effect since 1880.

Coming sharply into focus just now is a need for entirely new laws to establish working relationships between the states and their counties and cities, Mr. Morony pointed out. Such relationships must be defined if officials at these various levels of government are to work together to bring future projects to the contract letting stage with a minimum of delay.

In numerous areas, he said, there is still conflict between the various jurisdictions involved in proposed highway jobs, and the reason is lack of legally assigned responsibilities. States and cities will soon find themselves collaborating on many complex and costly projects. They must reach agreement on dozens of different issues—planning and programming, design, maintenance, location, access control, right-of-way acquisition, financing and maintenance.

"Laws must be designed to permit these agencies to carry out their

own responsibilities effectively and to work together in close harmony," he declared. "The nation's lawyers will have as much to say about the progress of the new highway program as the engineers, administrators and contractors."

Some states have taken bold steps to put their legal houses in order. Legislatures in both Michigan and Minnesota have decided to completely overhaul and codify their highway statutes next year.

The Highway Research Board is currently conducting an intensive study of all the highway statutes in the 48 states. The objective—to analyze afresh the important basic principles of law which should govern highway department administration, right-of-way acquisition, and other such activities in the age of superhighways.

The first phase of the study has been completed—an appraisal of right-of-way laws in the states.

"We have been able to isolate 20 basic elements essential to a good right-of-way law," Mr. Morony said, "yet not one state law contains all of them and in most, many elements are lacking."

As for acquisition of property for future highway use, the laws in some states are woefully inadequate to enable highway officials to work ahead.

"Our legal findings show that 15 states are authorized to acquire property for future highway use, although the authority varies from state to state," he said. "The statutes of six seem to imply that the highway department has such authority. The courts of five other states have sustained such acquisition. Neither the legislature nor the courts in the remaining 22 states seem to have dealt with this matter."

It is in such areas of weakness that highway administrators must seek to strengthen their hand if the highway program is to move ahead fast enough to please the motoring public.

Here's the only Complete Concrete Paving Line with Experience

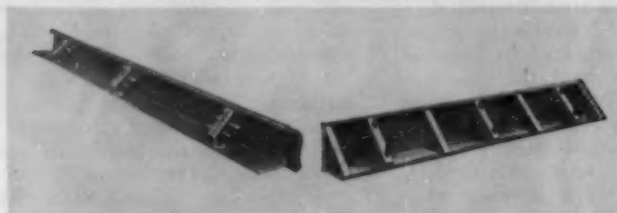
depend on the
BLAW-KNOX
"Complete Package"
for maximum profit



Only Blaw-Knox Concrete Spreaders Spread with a Blade — the NATURAL WAY

Only the Blaw-Knox Concrete Spreader spreads concrete with an automatic transverse Blade — the only *natural way to spread concrete* since it handles even dry, harsh concrete with a minimum of segregation, spreads it evenly no matter where it is dumped on the grade, requires a minimum of operator effort and clears the way for forward motion of the spreader. The Spreader can be set to spread to form level or below form level with or without pre-installed center joint. The automatic reversing action of the spreader blade relieves lateral pressure so alignment of forms is never disturbed.

A vibratory attachment that operates off the spreader power unit can be added that will assure maximum density without segregation, even in dry, harsh concrete. Width of spreader easily adjusted to meet all paving requirements.



Self-Aligning Road and Airport Forms

Setting Blaw-Knox Self-Aligning Paving Forms true to line and grade is a cinch. Look at all the features that save time and money. Double-wedge staking system prevents tipping of forms by crooked stakes. One-piece lock-joint end slides give you fast aligned joints. Buttress-type stake pockets together with over-all sturdy construction of the forms prevent mis-alignment. Road forms are available in heights of 6" or more and Airport forms in heights of 12" or more.



Dependable Blaw-Knox Finisher

Team-up a Blaw-Knox two-screed Finishing Machine with a Blaw-Knox Spreader and you can handle the output of two dual-drum pavers working at maximum capacity. With this team you will be sure of turning out highest quality finish from harsh, dry concrete. Easily adjusted widths and choice of traction and screed speeds adapt Finisher to fit any paving job.



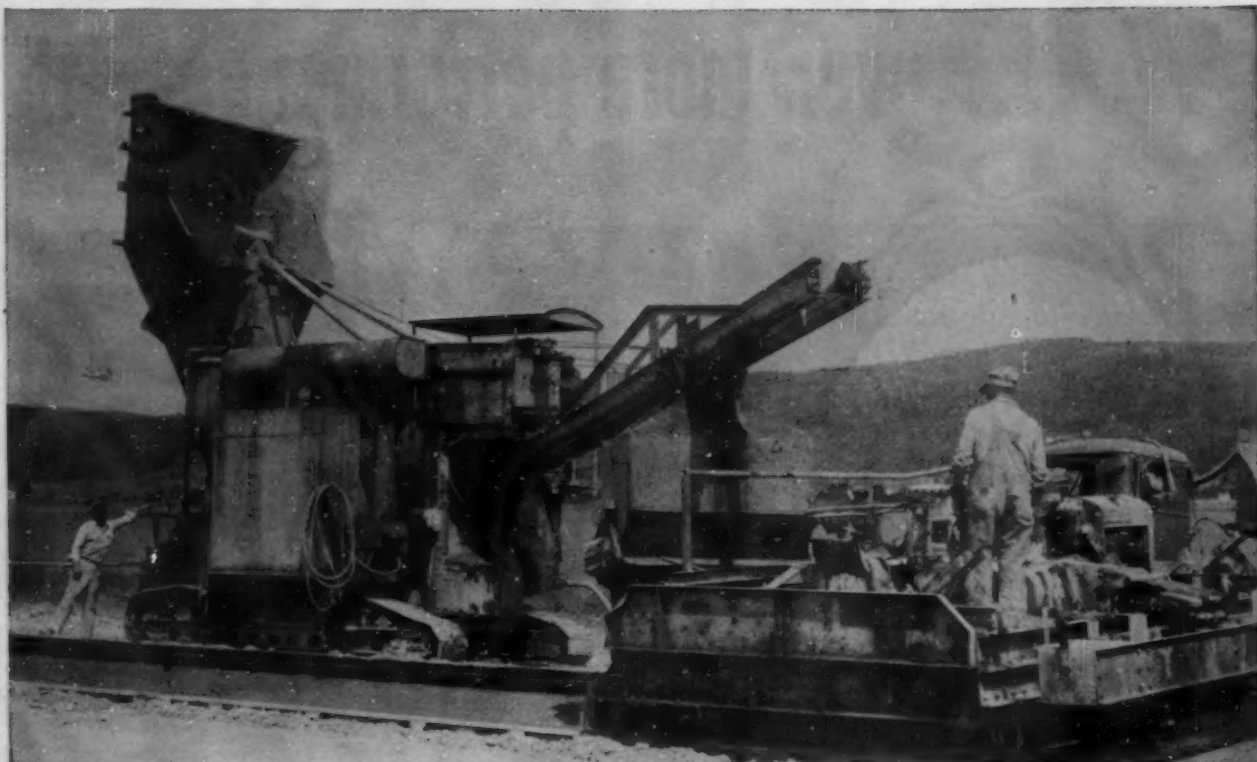
Blaw-Knox Precision Subgrader

Here's the only Subgrader that excavates by vibration — cutting through even the hardest subgrade to produce a perfect grade true to crown and cross-section. Fast and accurate, it produces more work with less power at a lower cost per square yard to assure accurate control of slab thickness to save concrete.

Fast Accurate Batching Plants

Blaw-Knox Aggregate and Cement Bins and Batching equipment are available to match the high capacity of all units in the Blaw-Knox Complete Package of Concrete Paving Equipment. Both Cement and Aggregate Batching Equipment are available with manual, push-button air-operated or automatic controls.





Blaw-Knox MultiFoote Paver with Hydraulic Controls gives you more complete mixing in a shorter Mixing Cycle

You will be sure of higher production for hour-after-hour and day-after-day when you have a Blaw-Knox MultiFoote working in your spread of paving equipment. Faster skip operation gets the batch into the mixer with no loss of time. Hydraulic controls of batch transfer and discharge give immediate response in the automatic cycle. Cone-shaped drums assure you of thorough mixing in a shorter time or more complete mixing in a specified time than is possible in the cylindrical-shaped drum of ordinary mixers. Hydraulic controls for raising and lowering the A-Frame enable the paver to get under over-

passes, bridges or other low overhead clearances and at the same time give you the advantages of single-cable skip control with its high speed, simple reeving and low maintenance cost.

These MultiFoote advantages combined with spreading or spotting action of the hydraulic operated bucket and simplicity of Paver design with its get-at-ability and freedom from excessive number of parts assure better day-after-day performance with lower maintenance costs. MultiFoote Pavers are available as single or double drum models in the 34E size.

All "Complete Package" Paving Equipment Job-Proved

Blaw-Knox "Complete Package" Paving equipment has become the first choice of contractors throughout the country. Contractors with a spread of Blaw-Knox equipment know that they can depend on its many tested and proved design features plus

one distributor source for parts and service to keep their jobs on schedule. If you are planning to bid on concrete paving, plan to use the only line of equipment with experience—see your nearest Blaw-Knox Distributor today.

For more information on any of these units send for the following bulletins by number—MultiFoote, No. 2616; Road Forms, No. 2370; Finisher, No. 2517; Subgrader, No. 2227-R; Batch Plants, No. 2488; Spreader, No. 2485.



BLAW-KNOX COMPANY

Construction Equipment Division

44 Charleston Ave., Mattoon, Illinois

... for more details circle 212, page 16

ROADS AND STREETS, April, 1957

NOW...even more performance with

THESE THREE NEW
FEATURES PROVIDE MORE
WORK-ABILITY THAN ANY
OTHER SINGLE ENGINE
SCRAPER OF THE SAME CAPACITY

1. New Model 6-110
300 h.p. engine of
improved design with
Roots Blower
2. Now with 4-speed
Torqmatic Drive
3. Better power-to-
weight ratio



Improved full hydraulic steering gives the S-18 still better maneuverability and ease of handling. In spite of its size, this scraper makes a non-stop turn in only 36'. Hydraulic lever action of bowl, apron and ejector eliminates down time caused by cable breakage.



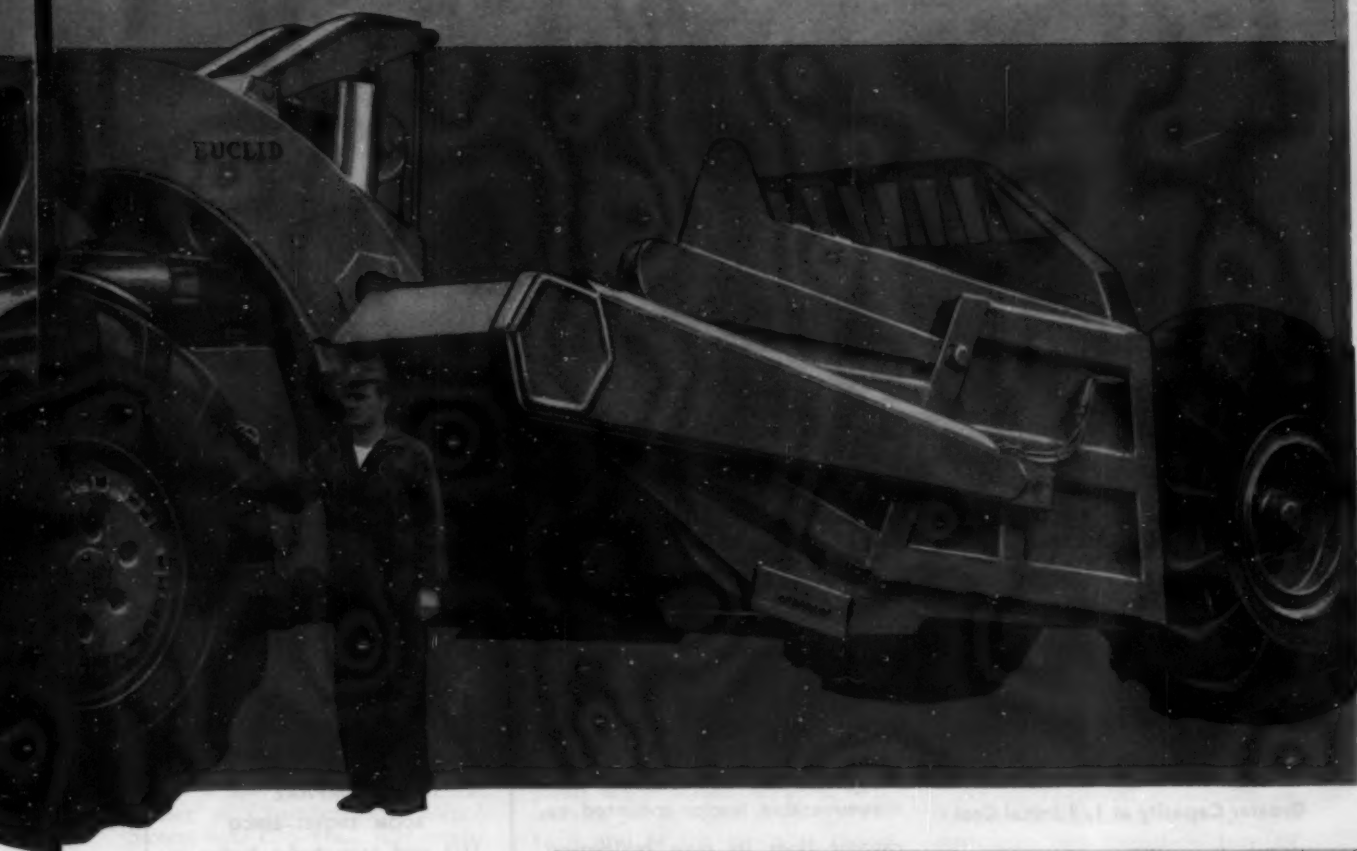
Torqmatic Drive with new 4-speed semi-automatic transmission, 300 h.p. engine, big tires, NoSpin differential and low, wide bowl provide fast, easy loading in any scraper material. The 4 section cutting edge is reversible and interchangeable—it's adjustable for varying job conditions.

A big machine for big jobs, the Model S-18 Euclid Scraper has proved its ability to outperform comparable scrapers in productive capacity and low cost yardage. Now it has even more built-in performance with an improved power-to-weight ratio, and easier operation and accessibility than before. This new S-18 will surpass its previous high production records.

The improved 300 h.p. engine and new 4-speed Torqmatic Drive give still better performance in the lower speed ranges that are so important to efficient scraper operation. Simplified design of the engine with the Roots Blower reduces maintenance time and costs and gives more durability and fuel economy. With the 4-speed semi-automatic transmission there's a better range of speed and torque for every scraper power requirement . . . from the maximum torque needed for loading to the higher speeds used on the haul road.

Already preferred by many leading contractors because of its greater work-ability, this new S-18 incorporates many important improvements. Your Euclid dealer will be glad to explain these new features and cost-cutting advantages and show you why *Euclids are your best investment.*

the improved EUCLID S-18 SCRAPER



Faster cycle time with Torqmatic Drive—there's no clutching or loss of speed when changing from one speed range to another. Top speed with heaped loads up to 25 yds. is over 20 mph. Short overhang of the engine gives good stability for rough going and long, high speed hauls.



EUCLID DIVISION
GENERAL MOTORS CORPORATION
Cleveland 17, Ohio

... for more details circle 239, page 16



Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



105 Tractor-Excavator powered by 143 HP GMC Diesel engine can lift and load single pieces up to 12 tons.



THE EIMCO 105 EXCAVATOR LOADS MORE - FASTER.. CHEAPER

Eimco 105 Tractor-Excavators operate on a 10 to 12 second loading cycle. This speed can be maintained under ideal conditions.

Greater Capacity at 1/3 Initial Cost -

In tough conditions the 105 will out-perform other excavating equipment on a more impressive scale. It will pick up and discharge into the haulage unit much larger pieces of material than will go thru the bottom of a bucket on a boom shovel of equal (1½ yd.) capacity.

The 105 will exert greater digging force at the bucket lip than the larger, more expensive boom equipment - often eliminating blasting.

Equipment used around boom shovels such as bulldozers (for pushing up the broken rock) are eliminated with the Eimco 105 because this maneuverable tractor mounted excavator does its own bulldozing.

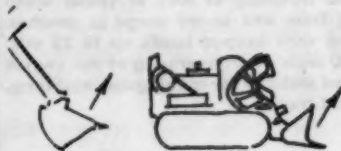
Eimco 105's are rugged, heavy duty machines, built to stay working on the job. Proven overall operating and maintenance costs are 40% less than boom shovels of same bucket capacity. Independent final drives provide greater maneuverability. Up-front position for the operator gives him full visibility. There are many other advantages in the 105. Write for complete information.



COMPARE

BOOM SHOVEL—EIMCO

11/2 yard boom bucket loading is limited to size that will go thru bucket. Eimco 11/2 yard bucket load is limited only to weight machine can lift.



COMPARE

BOOM SHOVEL—EIMCO

Digging effort on 11/2 yard boom shovel (45° boom angle bucket on ground) 24,000#. Digging effort on 11/2 yard Eimco shovel 39,200#.

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A.

• Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y.
Cleveland, Ohio

Chicago, Ill.
Houston, Tex.

San Francisco, Calif.
London, England

El Paso, Tex.
Gateshead, England

Birmingham, Ala.
Paris, France

Duluth, Minn.
Milan, Italy

Kellogg, Idaho
Pittsburgh, Pa.
Seattle, Wash.
Johannesburg, South Africa



B-245



● Straight and curved sections of double bulb steel curb facing are stockpiled with little danger of damage.

New Type Steel Curb Easily Installed

Steel curb facing in areas of heavy commercial traffic is nothing new to New York City. The first such installation (actually a formed plate section), was installed 31 years ago. It has needed no maintenance since, according to a report from Bethlehem Steel Company. Today this curved section, corner of Chambers and Center Streets near City Hall, still retains its vertical face.

Today the city is placing steel curb facing in heavy traffic areas in lieu of new granite. Currently it is installing steel curbing along Third Avenue, as part of the Avenue's face-lifting. About 700 tons of facing is being installed consisting of a new section rolled by Bethlehem. At Chatham Square in New York 5,700 lin. ft. of steel curbing has just been installed, the contractor was Frank Mascali & Sons.

The new facing differs slightly from facing heretofore used in the commercial districts. The lower flange (or bulb) has been shortened to permit better flow of concrete up and under the flange. As specified by the city, the new curb has a 9-in. high section, weighs 15.5 lb. per lin. ft. (5 lb. less), and comes in 20-ft. lengths. Price-wise, the new facing is competitive with previous designs and cheaper than new granite.

The city will continue to use redressed granite now on hand or in-

stalled. To reuse the granite now installed requires redressing, a slow operation. The new curb requires no skilled craftsmen, and is easy to curve on the job for large radii.

To anchor the facing to the concrete backup, steel anchors are butt welded to the back face. Expansion joints are provided between 20-ft. sections of straight curbing. On radii and at the joints at radius ends, sections are welded both at the top bulb and along the face of the section.

Double bulb curb facing can be set 350 ft. per day (granite about 200 ft.)



● A blue stone curb in the City Hall area, showing problem of deterioration.

When a roadway must be widened, the steel facing can be removed, the old concrete broken away, and the facing reused. No redressing is necessary.

Prestressed Concrete World Conference in California

An international conference on Prestressed Concrete will be presented in San Francisco July 29 through August 2 by the University of California for some 600 engineers, scientists, architects, contractors and manufacturers from all over the world.

The week-long conference is presented by the University in cooperation with the Prestressed Concrete Institute, the International Federation de la Precontrainte, the American Concrete Institute, the American Society of Civil Engineers and other technical societies. The Prestressed Concrete Institute will hold its third annual meeting concurrently with the conference.

The program will consist of papers on precast prestressed members, prestressed thin shells and slabs, research, design, and construction in various countries. Panel discussions will be conducted on basic principles, materials, techniques, production, inspection, design and specifications. One day will be devoted to field trips to construction jobs and visits to prestressing plants near San Francisco.



● Open-cut sewer under construction for Congress Street Expressway in the vicinity of Wolf Road. In the trench a Northwest 95 dragline is working on the lower 25 ft. of excavation. On the south bank a Bucyrus-Erie 54-B is lowering pipe and placing backfill. The picture also shows how the bank was cleared to make room for equipment, materials and pipe.

Deep Storm Sewer Built in Open Cut

Along the western end of Congress Street Expressway in the Chicago area, at depths as great as 50 ft. below the surface, lies 4,600 ft. of 84-in. diameter storm sewer that was put in place in a manner considered unique in local drainage engineering.

Heretofore, 25 ft. down was con-

sidered by the Cook County highway engineers to be the limit practicable for open cut work in the Chicago area clay. At greater depths, engineers generally favored tunneling as more economical. In this particular area, however, the Cook County highway department believed the open cut method

would save costs. The soil was firm clay and being in open country there were no utility installations to avoid. The job has been completed at a figure approximately half a million dollars under the estimate for tunneling.

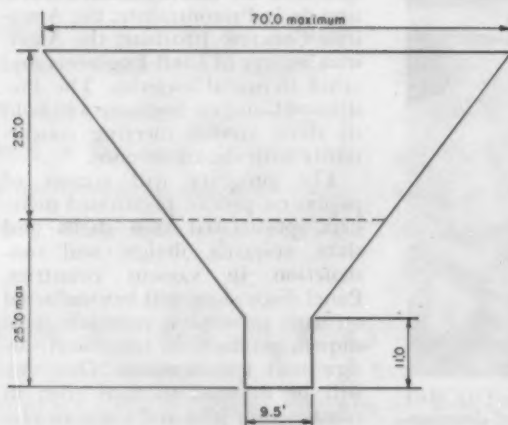
This section of sewer will drain the expressway from west of Mannheim Road to County Line Road, the Cook County boundary. It is joined by a 72-in. storm

sewer draining the Lake Street connection from North Avenue to Congress Street. At the county line, the 84-in. increases to 96-in. and empties into a creek.

The top 25 ft. was excavated by a Northwest 95 dragline and Bucyrus-Erie 54-B dragline working together tossing the dirt on opposite banks. While this was being done, a Cat D7 dozer was on the south bank pushing the excavated material aside to make room for the delivery of pipe and backfill material. The dozer also provided space for the equipment to lower the pipe in place.

After the top 25 ft. was excavated, the Northwest 95 completed the balance of the excavation, while the 54-B was placed on the south bank to lower the pipe and place trench backfill material.

There were no cave-ins as the soil was a hard clay. Contractor was Healy Bros., of McCook, Illinois, Bernard Kavanaugh, superintendent, with Peter P. Fischman, resident engineer for Cook County.



● Cross-section of deep open trench in clay.

ANOTHER **NEW "Euc"** **SCRAPER**
MODEL **SS-18**

...25 yards heaped



300 HORSEPOWER • TORQMATIC DRIVE

...high speed production over the long hauls

Consider this new Euclid for your earthmoving requirements. Designed for increased production on the long haul scraper jobs, the SS-18 combines power, speed and 18-yard struck capacity.

Six-wheel design provides good weight distribution and the stability needed for high speed, long hauls. A 300 h.p. diesel supplies the power through Torqmatic Drive. There's no clutch — change from any one of the three speed ranges to another is made under full power. Both drive and scraper tires are 24.00 x 25, with 29.5 x 25 optional for jobs requiring maximum traction and flotation.

For more details on this big high production scraper, contact your Euclid dealer...ask him to show you why Euclids are your best investment.

EUCLID DIVISION, GENERAL MOTORS CORP., Cleveland 17, Ohio

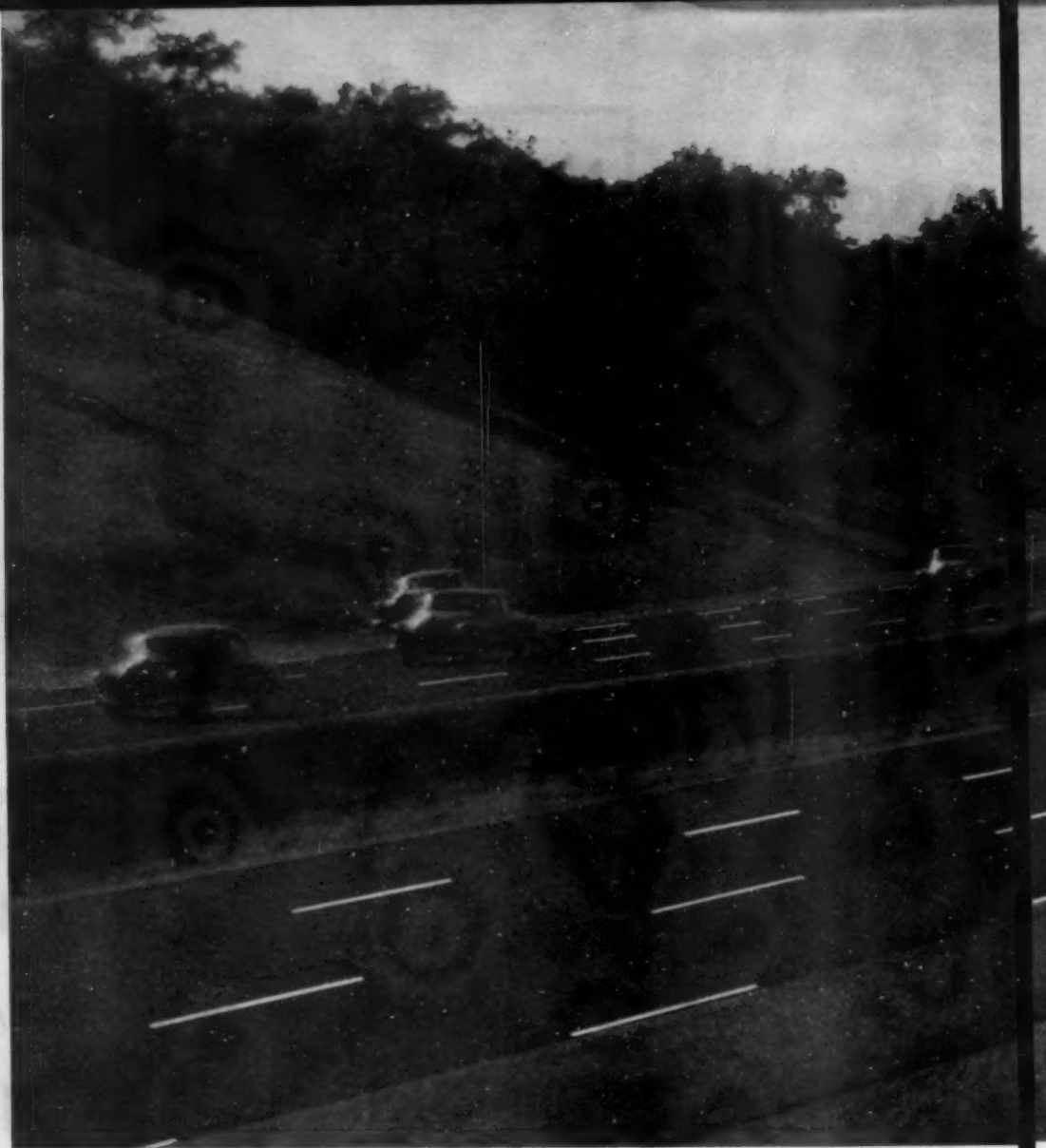


Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



The new Asphalt constructed Route 128, near Boston, replaces the old route built 25 years ago. The highway consists of two roadways each of which has three 13' lanes and a 10' shoulder. Roadways are separated by a depressed grassed median varying from 30' to $\frac{1}{4}$ of a mile. The pavement consists of 12" well-compacted gravel sub-base, 4 $\frac{1}{4}$ " penetration macadam base, 1 $\frac{1}{4}$ " Asphaltic concrete binder course and a 1 $\frac{1}{4}$ " Asphaltic concrete surface course.



Old road that gave traffic "the creeps" ... built with high economy... for low maintenance ...

Outmoded road conditions slowed traffic to a creep on the old Route 128, in Massachusetts.

So a new, wider Route 128 was recently completed ... for today's and tomorrow's traffic. With greater capacities ... better layout, grades and crossing eliminations.

It's a smooth-driving, long-lasting Asphaltic concrete highway. Built at low cost. To make cars and trucks glide along, safely. And to be easy on taxes ... for generations to come.

Modern heavy-duty Asphalt construction has proved to be ideal for highways and primary roads

in every section of the country. It allows unusual design versatility ... speed and ease of construction.

Asphalt pavement is resilient, rugged, skid-resistant. Glare-absorbent. It seals out damaging moisture ... is not affected by de-icing salts that usually damage other pavement. Snow and ice melt faster, too. The way ahead is clear, quicker.

In the face of rising construction costs you can keep within budgets by paving with Asphalt.

You'll keep costs down ... keep performance high ... keep taxpayers happier ... when you design for modern Asphalt construction.



... replaced with wide, durable Asphalt Highway
and low future taxes

PREFERS Asphalt Construction

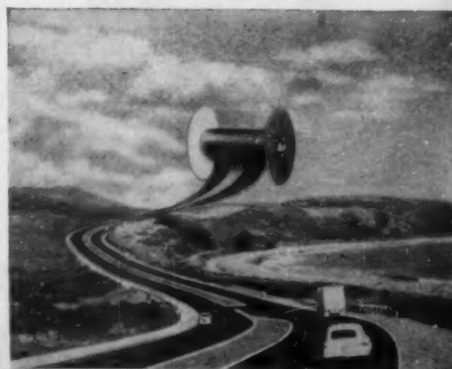
One of the companies that played a leading role in the building of the new Route 128 is the M. De Matteo Construction Company, Quincy, Mass.

The Superintendent of this company, engineer Roland S. Delaware, writes, "I have worked with Asphaltic pavements since 1931, and have always advocated the use of Asphalt in preference to other types of pavement. I like it from an engineering standpoint...and enjoy the riding qualities and speed of construction."



THE ASPHALT INSTITUTE

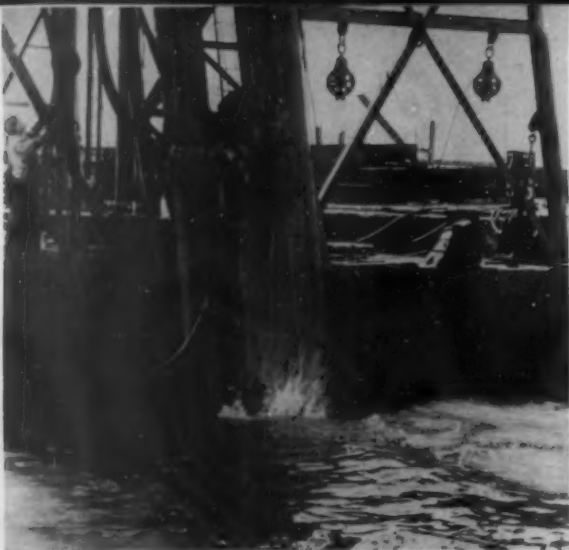
Asphalt Institute Building
College Park, Maryland



Ribbons of velvet smoothness

MODERN **ASPHALT** HIGHWAYS

... for more details circle 205, page 16



● On the bow of driver "Pacific Giant"—S-10 McKiernan-Terry hammer has just entered the water driving 89 lb. steel H batter pile for Pier 61.

Heavy Pile Hammers

Handle Big

Driving Job

Pile driving was a major chapter in the construction of the long bridge between San Rafael and Richmond, California, spanning the northern part of San Francisco Bay. Part of this project, which was completed during the 1956 summer, was carried out by Ben C. Gerwick, Inc., and Peter Kiewit Sons' Co., involving a \$15,000,000 contract for 79

piers to support the bridge. (See Roads and Streets, April, 1955, "Aluminum Trusses Aid Bridge Erection.")

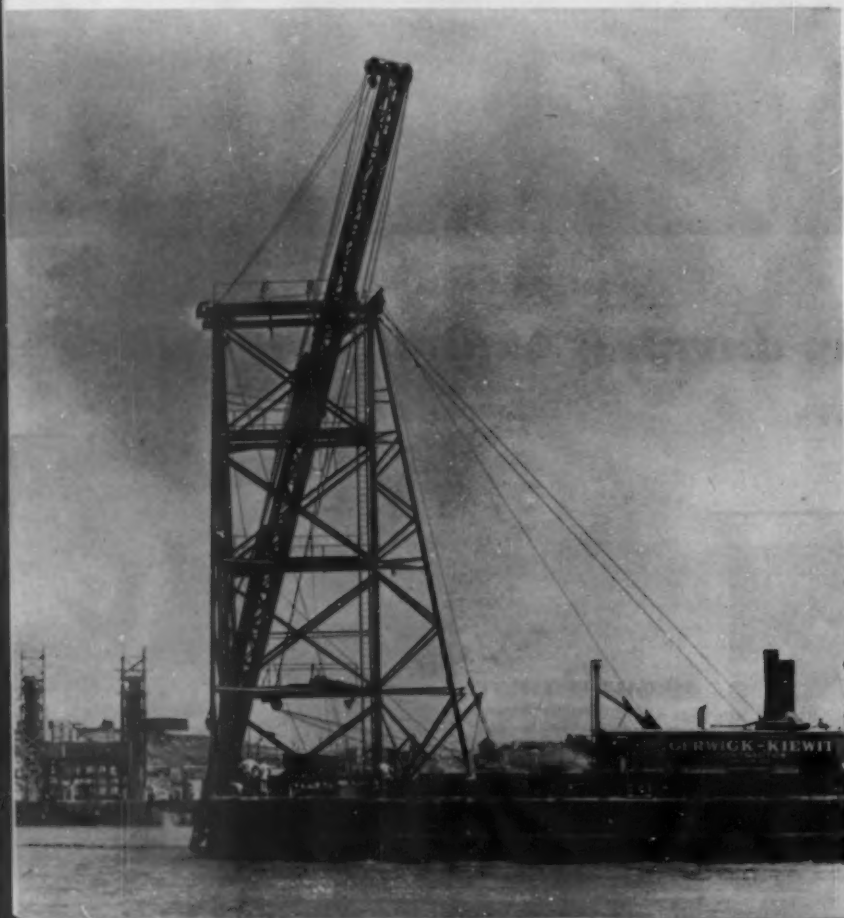
The statistics of the pile-driving operation make an impressive listing. There were 5,100 steel H-piles, 14 in. by 89 lb. up to 201 ft. in length for a total of 26,000 tons of steel. In addition, 1,500 fender piles up to

150 ft. long and 1,200 falsework piles were also driven, an additional 2,700 piles. Three McKiernan-Terry S-10 single acting pile hammers were used. They delivered 32,500 ft.-lb. per blow and permitted driving underwater. One was a spare, and the others were mounted on the two largest floating drivers on the West Coast, the 38 x 108 ft. Pacific Giant and her sister ship, the Pacific Titan. Of the 79 piers, 62 are in deep water, 8 in cofferdams and 9 dry.

The job went well ahead of schedule despite a constant with tidal currents and the problems created by the extreme length of the piles, batter requirements, orientation, the need for introducing piles into a template 30 to 60 ft. below the water surface, and hard driving through 150 ft. or more of sand, mud and silt, to sandstone.

Features of the scowdrivers used are 120 ft. leads which in turn carried a 20 ft. long set of telescoping submarine leads, extra boilers, a fore and aft batter arrangement on the leads, five steam engines for handling piles, hammer, high pressure water jet, mooring lines and movable ballast. A steam powered air compressor was put in use when the hammer was submerged, and each driver was equipped with a Sperry Gyro compass for accurate orienta-

- The driver "Pacific Giant" about to drive a 3:12 batter pile in Pier 61. Note pile is now in the leads—hammer has been raised but not yet placed on top of pile. Diver is down, entering pile in slot in precast concrete grid. Cofferdam for Pier 63 can be seen in the background.



tion of piles, which were variously driven plumb, on a 2 in 12 batter, or on a 3 in 12 batter to satisfy the requirement for orientation of pile webs along radial lines from the pier center.

The first piles were timber false-work driven under water and cut off. They provided temporary support for precast concrete grids which act as pier bases. The saw and the S-5 McKiernan-Terry pile hammer used were set in the same lead and the operator thus was in constant control and able to establish precise elevation for sawing. Piles were driven 30 to 90 ft. as required and cut off to the exact grade of the pier base. The saw was powered by hydraulic drive from a Buda diesel engine.

When it was determined that a strong bond could be obtained under existing conditions between steel piles, tremie grout, and precast concrete, a precast concrete grid was selected as the pier base structure. The grid is 1 ft. thick and fitted with slots to match the H-piles, which were guided into place by a diver. When the piles were driven, the slots were filled with tremie grout. Thus, the pier base supported upper precast concrete units and tremie fill as it was being placed. Vertical piles were driven first. When they had been grouted into the grid, batter piles were driven and grouted. The longest pile driven during the job was one of 201 ft.

Piles were also used to mark points to be dredged and to support survey platforms constructed along the path of the bridge, about 100 ft. from the centerline. These will be used by engineers to check positioning of the piers. Pipe pile, 125 ft. long, is inserted in a leg of the survey platform. 10 in. diameter piles are inserted in 12 in. diameter tower legs. The tower extends to the mud line, and cross bolts hold the platform to the piles.

Estimates Almost "Perfect"

The engineer's estimates on highway construction bids for 1956 were only four-tenths of one percent different, on the average, from the contractors' bids on Colorado State work.

So noted Vernon L. Albers, Chief of the Estimates Section of the Colorado Highway Department in a report to the surveys and plans engineer, Adolph Zulian. These estimates totaled over \$30,400,000 on 87 projects covering 455 miles of new work.



● The "Pacific Atlas" places concrete cone units of 130 tons on bottom shells.

\$6,000,000 Interchange for Weston, Mass.

Major new traffic facility for New England is shown in the artist's sketch. The \$6,000,000 interchange, located in Weston, Mass., where the new cross-state Massachusetts Turnpike has its eastern terminus with Route 128 which arcs around Boston from north to south, is now completed. Designed by The Clarkson Engineering Co., Inc., in a speedy three months, it will be able to carry up to 90,000 vehicles a day when it is opened along with the full, 123-mile tollroad in the 1957 Spring. It will be a link between eastern New England and points west and south.

To speed up design, Clarkson made extensive use of photogrammetry; machine calculations for arriving at quantities; a strict control system for plan changes and modifications; biweekly conferences with the Massachusetts Turnpike Authority, B. Perini & Sons, the general contractors, and the

Authority's engineering consultants. The project involved 380,000 cu. yd. of excavation and 287,000 cu. yd. of fill.

Here is a description of each ramp. ("T" stands for the Toll gate.)

Ramp A: To take vehicles coming north on Route 128 onto the Turnpike.

Ramp B: Parallels Ramp A and takes from the Turnpike to Route 128 vehicles intending to drive north on Route 128 or into Boston via Commonwealth Avenue.

Ramp C: Takes vehicles from the Turnpike to Route 128, south.

Ramp D: Takes vehicle south on Route 128 onto the Turnpike.

Ramp F: A minor ramp to take vehicles from South Avenue (Route 30 in Weston) to the Turnpike to travel west.

Ramp G: A ramp to take vehicles from Commonwealth Avenue, Auburndale, to the Turnpike.



Save Hours with

SHAWNEE®

Chief or WARRIOR TRUCK MOUNTED UNIT

Truck is heavy duty, 4-wheel drive with separate power takeoff to operate hydraulic pump.



- Exclusive "Push-Pull" Power—the Power with a "Punch"
- Digs 12-15 Feet Deep
- Sold as a Complete Unit or Mounted on Your Truck
- Mounts on Most All Popular Tractors

SHAWNEE Chief

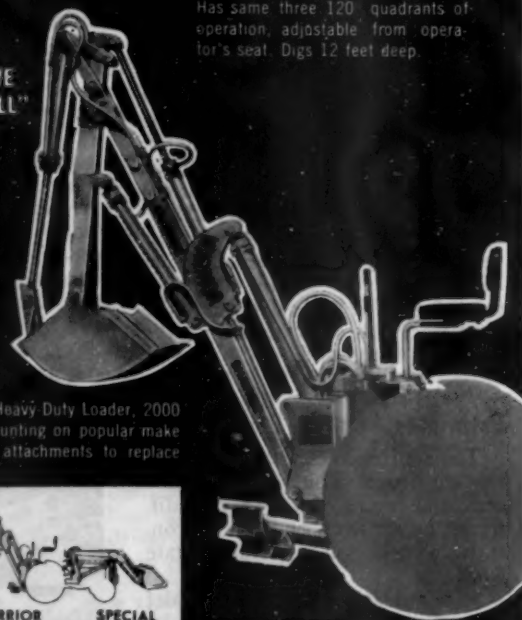
Biggest of the backhoes—provides tremendous digging force with "push-pull" cylinders operating synchronously. 6-spool control panel enables use of any or all controls at one time. Digs 15 feet deep.



EXCLUSIVE
"PUSH-PULL"
POWER

SHAWNEE WARRIOR

Slightly smaller version of the Chief. Has same three 120° quadrants of operation, adjustable from operator's seat. Digs 12 feet deep.



Loadmaster, 3500 lb. lift, or Special Heavy Duty Loader, 2000 lb. lift, are available for use when mounting on popular make tractors. A complete line of special attachments to replace loader buckets is available.



For Additional Information, write

SHAWNEE MANUFACTURING COMPANY,
Incorporated

1947-G TOPEKA AVENUE • TOPEKA, KANSAS

... for more details circle 290, page 16
ROADS AND STREETS, April, 1957



245 hours less greasing time... 245 hours more profit time **EVERY YEAR!**

Time saved by 1,000-hour lubrication intervals on your Allis-Chalmers tractor adds up to 245 hours every year—an extra month of production!

On truck wheels, support rollers and idlers, an exclusive combination of positive, spring-loaded seals and tapered roller bearings keeps out dirt and moisture, prevents loss of lubricant.

For 1,000 tractor work hours, you can forget about every grease point below track level. When it's time for servicing, simple low-pressure flush lubrication replaces old grease completely, eliminates seal popping, prevents damage to seal faces. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

IT'S SIMPLE ARITHMETIC!

	Other Tractors	Allis-Chalmers Tractors
No. of greasings per year (5,000 hr)	up to 500	5
Greasing time (av. conditions)	½ hr	1 hr
Time spent greasing	up to 250 hr	5 hr
PRODUCTION TIME GAINED . . . 245 HOURS EVERY YEAR!		

ALLIS-CHALMERS

... for more details circle 197, page 16

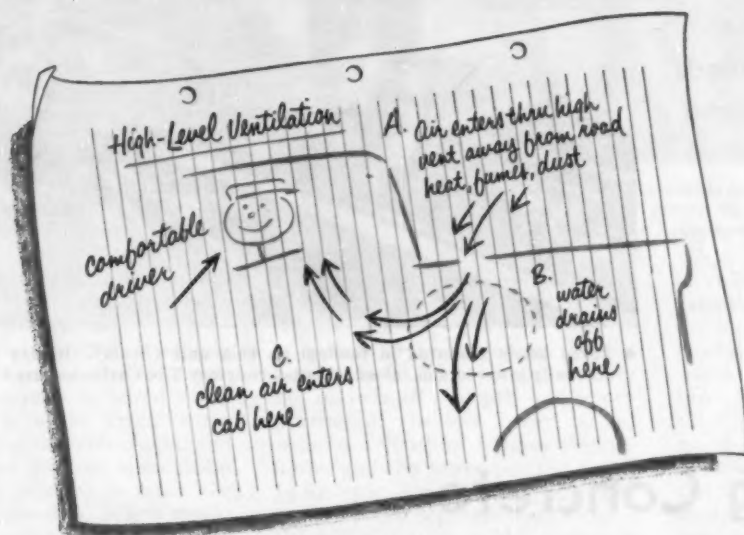
ROADS AND STREETS, April, 1957

Engineering in Action

in a Chevy cab,



even the air is better!



... more evidence that Chevrolet Task-Force Trucks are engineered better and built better for bigger savings!

These cab features give you extra comfort and safety behind the wheel, extra savings on truck maintenance. And they're proof that the most modern trucks for your money are Chevrolets!

The drawing "doodled" above shows how Chevy's High-Level ventilation provides a comfortable interior ... and the numbers in the big picture (at left) point out other advantages equally as good to have around you when you haul! They include:

① A roof that's specially built for safer, more comfortable hauling. Sturdy all-steel turret-top construction adds to safety; inner reinforcement provides a dead air chamber that insulates against heat.

② A gleaming, durable baked enamel outside finish. Here's the reason your Chevy's exterior will resist wear better, look like new longer! Wide variety of colors available.

③ A Nu-Flex seat that beats the bumps! Deep-comfort coil springs, jounce-smoothing metered air shock damping and 3-way adjustment let you take it easy on tough jobs!

④ A cab that's rustproofed to last! Doors and similar surfaces are rust-proofed by immersion. Thus, such surfaces are protected against rust on the inside as well as on the outside!

⑤ Concealed Safety Steps for convenience. Inside each cab door, they give you firmer footing, make entering or leaving the cab easier and safer.

⑥ An undercoated floor, cowl side panels and fender flanges. Virtually

all exposed surfaces on the underside of the cab are protected against wheel splash by an anti-rust coating.

⑦ A non-glare instrument panel to make driving safer. The textured finish on upper portion of Chevy's instrument panel reduces blinding sun reflections, minimizes eyestrain.

⑧ Reliable 2-speed electric windshield wipers*. Powered by electricity rather than by engine vacuum, their action remains constant under all conditions.

Such advantages as these (we've shown only a few) combine to make everything better in a 1957 Chevrolet truck! You'll see for yourself when you examine the model of your choice at your Chevrolet dealer's. ... Chevrolet Division of General Motors, Detroit 2, Michigan.

*Standard on Series 5-6-7-8-9-10000 models.

... biggest sellers because they're the biggest savers!

CHEVROLET

CHEVROLET TASK-FORCE 57 TRUCKS

... for more details circle 237, page 16

ROADS AND STREETS, April, 1957

New cutting tools are keeping step with the march of modern methods in concrete highway and air field work . . .



• Three heads mounted in tandem on this unit (Seals). Blades are manually lowered and raised. (Photos courtesy The Carborundum Co.)

Cutting Concrete With Diamond and Abrasive Blades

By J. H. Denton

Product Engineer, Diamond Products Plant, Bonded Abrasives Division

and J. I. Jenkinson

Abrasive Engineer, Abrasive Engineering Branch, Bonded Abrasive Division,
The Carborundum Company

THE advent of diamond segmental blades and bonded abrasive blades, engineered specifically for concrete sawing, has resulted in revolutionary methods for laying new concrete and repairing and replacing sections of old concrete. These new abrasive tools are finding wide acceptance in the building of highways, airport runways and aprons, parking areas and many other applications where contraction joints are required. Highway repair work is expedited by their use. Industrial applications, such as removing sections of concrete flooring for repairs, machine installations, or for laying pipes and electrical conduits are much less difficult, and much less expensive

through the use of diamond and abrasive blades.

Why contraction joints? Contraction joints are necessary in highway and airport runway construction to prevent random cracking which normally occurs as the concrete dries. This cracking extends through the entire thickness of the slab. The improvements on joint sawing machines and the development of new ones in recent years—in conjunction with new and improved blades—allow the contractor to pour concrete in a continuous strip without stopping to make contraction joints.

Prior to the development, some ten years ago, of diamond blades for sawing concrete, all contraction

joints had to be hand formed. Single sections of concrete, usually not exceeding 50 ft. in length, were poured. At the end of each section the contractor had to "head up" or stop pouring concrete and insert a contraction joint form before continuing the pour. Always, the concrete had to be allowed to "set up" or cure for a certain length of time before this could be done.

From the time the curing process begins, stresses are building up in the slab and uncontrolled or random cracking can result. The old-fashioned method required that the concrete be fairly well set up before forming the joint. But to disturb it after the initial set has taken place generally leads to random cracking anywhere in the slab and crumbling or spalling at the joint at a later date—and the eventual deterioration of the pavement. It is extremely difficult to make a proper sealing job under conditions of crumbling or spalling—and joints that are not properly sealed, allow water to penetrate and seep through under the slab,



● Nozzles on either side of blade are so placed as to assure maximum supply of water to blade.



● Tank truck of water coolant, as well as a compressor unit which supplies power to the saws. This tank truck is a part of the Seals sawing unit.

thus undermining it to the extent that it will later break up under heavy traffic conditions.

The modern method of sawing joints prevents uncontrolled cracking when the joint is sawed while the concrete is in the "green" state. Actually, sawing controls cracks, and in most cases can be done soon enough after pouring to offset the stresses that develop. When cracking, which cannot be avoided, does actually occur, it is in a controlled manner at the point where a weakness plane has been purposely established by sawing.

The width and depth of the joint differs according to the terrain over which the concrete is being laid and the climatic conditions that pertain to the area. The engineers of the various state highway departments are greatly influenced by the weather when making joint recommendations in the respective sections of the country where the work is being done. The Corps of Engineers, who are responsible for the construction of most Air Force bases, face similar weather problems and vary their specifications for joints accordingly.

The most common method employed in joint cutting is to make

a cut not less than $\frac{1}{8}$ in. wide to a depth usually $\frac{1}{6}$ of the over-all thickness of the slab.

A step-type joint is sometimes a requirement. This joint is usually $2\frac{1}{2}$ in. over-all in depth—the upper portion of the slot being $\frac{1}{4}$ in. wide to a depth of 1 in. or slightly more, and the lower portion being $\frac{1}{8}$ in. wide. A step-joint is generally made in two separate operations—the wider portion at the surface is cut first, and then the joint is completed with a thinner blade cutting the deeper section. Some machines are designed to accommodate two blades in tandem, thus completing the two cuts almost simultaneously.

A third type of joint is "V-ed" at the surface. An ordinary straight joint $\frac{1}{8}$ in. wide is first cut, then a $12" \times \frac{3}{4}"$ wheel with an E face is used to cut the "V" shape at the surface.

New Cutting Tools

Recently, The Carborundum Company has developed and placed on the market two new diamond blades in wear-resistant tungsten carbide bond which design permits retention of the diamond particles until each has rendered its full

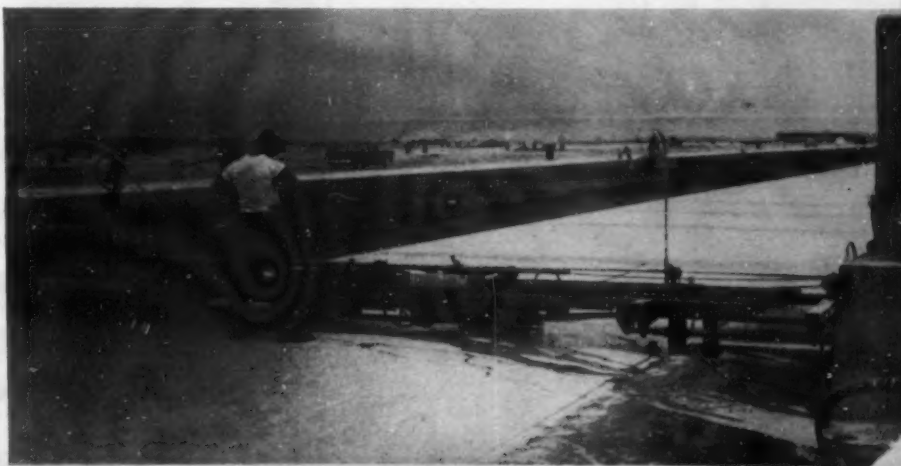
service. These blades have proven capable of retaining their widths for longer periods than previously available blades. The DM 190, which is the harder of the two, is intended for cutting concrete in the "green" state—generally recognized as being 8 to 12 hours old. However, under severe weather conditions, curing is sometimes retarded and sawing is delayed for as long as 72 hours.

The DM 191 is slightly softer and is recommended for partially cured or fully cured concrete. Generally speaking, this blade is recommended for concrete which is aged for 72 hours or longer.

Because of their unusual and exclusive diamond segment shape, these new blades prevent, to a great extent, the excessive wear usually experienced in the steel center in blades of conventional type. Although there is a wide range of blade sizes, most concrete sawing equipment is designed for the 12 and 14 in. sizes—and the most popular width is $\frac{9}{16}$ in. segment thickness. Blades in any arbor shape specified are readily obtainable.

Blade centers or cores are made of the highest quality saw steel with radial slots at the periphery, and

● Darkened areas mark out joints that have already been sawed. Water has not had a chance to dry—showing speed at which the machine advances. Seals machine in foreground.



are thinner than the diamond segment—thus giving clearance for sludge and coolant, and preventing side binding of the blade while in the cut.

The Carborundum Company has also engineered new abrasive blades specifically for concrete sawing. These are silicon carbide resinoid bonded blades, strongly reinforced with glass fiber cloth to allow a certain amount of flexing or side pressure (in the joint) without blade breakage.

Diamond vs Abrasive Blades

When to use diamond blades or the less expensive resinoid bonded blades depends entirely on the job to be done. Diamond blades are recommended where the concrete mix aggregate is very hard, such as river bottom gravel, trap rock, chat, quartzite, etc. The depth of the cut required is another factor in determining which blade to use. On deep cuts, the reduction of the diameter of abrasive blades is such that, although the wear is not exceptional by normal standards, it is still necessary to discard the partly worn blades in order to maintain uniform depth of cut.

On the other hand, where fairly shallow cuts of 1 to 1½ in. deep are required, and a soft aggregate such as limestone is in the mix, it is economical to use the reinforced blade, although the diamond blade is also suitable for this type of job.

Job conditions such as depth of cut, type of aggregate and curing

time influence the speed of cut and blade life. Curing time is as important as any of the factors mentioned.

Studies have shown that Resinoid Bond Abrasive Blades have given as much as 1000 ft. of cutting at 1-in. depth on concrete containing soft aggregate, while Diamond Blades have cut well in excess of 1,500 ft. at 2½ in. deep on harder type aggregate. Naturally, the exact amount of footage produced by any blade will depend to a large extent on the many variables encountered.

Many types of specially designed machines are available for concrete joint sawing. These are usually gasoline-powered with motors from 13.5 to 36 hp. Some of these machines are manually pushed, others are self-propelled—at variable rate of speed. A few of the more modern machines also have an adjustment for direction alignment, should the machine start to lead off the line of cut.

Blades Tandem Mounted

Many large machines, and some smaller ones as well, are available with blades mounted in tandem. There are also large track machines or span saws mounting two or more blades which actually span the entire slab of concrete. Each blade is mounted in a separate cutting head and is individually powered with an electrically driven motor. Each of these blades cuts a certain distance. Because of their perfect alignment in the machine, each

blade leads right into the path of the blade at the next station ahead of it. These same machines are used for cutting the longitudinal joints. This is done by attaching a dolly to the rig, and as it moves from one traverse joint to the next, it cuts the center joint in between. Wheel speeds of most of these machines are usually around 3400 RPM.

Coolant is Important

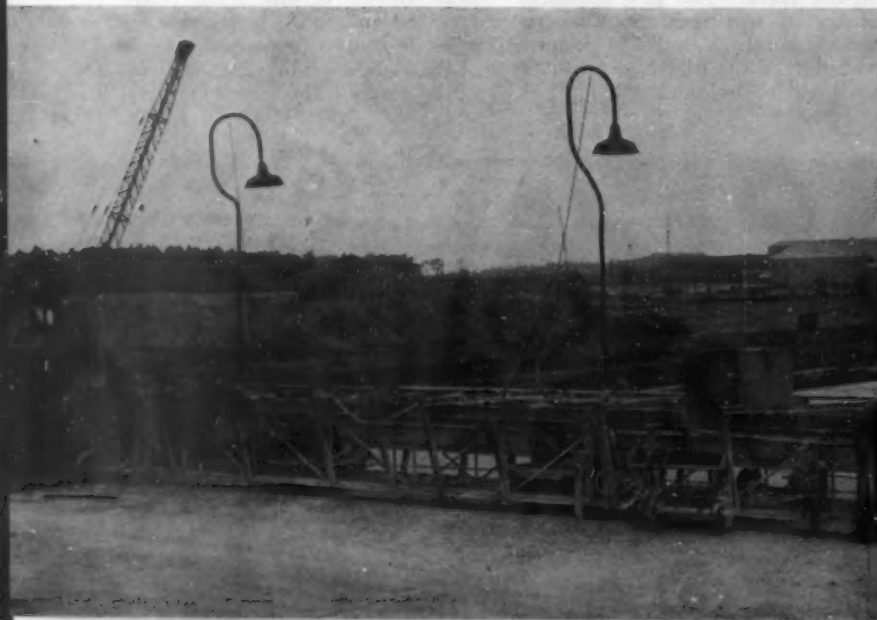
Plain water is used as a coolant in concrete sawing. For successful operation it is essential to have a plentiful supply. If the blade is allowed to run dry, it may throw the segments and distort the center in a matter of seconds.

The optimum blade life is assured when the saws advance at normal speed for the type of cut being made—and plenty of coolant is available. If excessive speed is permitted, the blades may become overheated and the center lose its tensioning and start to flex. This could lead to the center cracking as a result of "fatigue". Loss of segments on a blade can be caused by these same conditions.

Transverse joints are generally sawed within 8 to 24 hours after pouring the concrete. However, in cooler weather, sawing may be delayed for a longer period. The way most operators determine the time to saw the joints is to jab a pen knife into the concrete. The depth to which it penetrates indicates the extent to which the concrete is set up. A piece is chipped out and examined. If it comes out in one piece without crumbling, the cure is well advanced and sawing should be started without delay. On the other hand, if it crumbles, it generally is considered too green and sawing should be delayed.

Opinions vary greatly about the proper time to saw. However, it is generally accepted that, if the edges of the cut are very smooth, and there is no breaking or ravelling out, the concrete is set up a little too much. Many contractors—particularly the larger ones using the span saws—want to start sawing when the blade causes a slight ravelling or feathering on either side of the cut. They agree that concrete in this condition is not set up too much. Whenever the concrete has passed the proper condition for sawing, it becomes necessary to cut control joints—usually, this is every fourth joint. The purpose is to relieve stress and prevent uncontrolled or random cracking.

- Span saw, by Pavement Controls, Incorporated, Cleveland Ohio, is electrically driven by diesel motor power. It has two sawing heads with hydraulic devices for raising and lowering the blades. This machine can be adjusted for slabs of various widths. Perfect blade alignment is assured.





SAVES ENGINES!

Use Sinclair SUPER TENOL® to save your Diesels from the harmful and costly effects of *severe* operating conditions. Sinclair SUPER TENOL is specially engineered for the tougher jobs! It saves engines by combating the effects of high temperature, over-loading, and continuous stop-and-go service. It helps eliminate deposits of varnish, carbon and sludge that impair engine efficiency. Experience shows that Sinclair SUPER TENOL keeps equipment on the job longer . . . with less wear and fewer repairs!

Refill now with Sinclair SUPER TENOL. Contact your local Sinclair Representative or write Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N.Y. *There's no obligation.*

SINCLAIR SUPER TENOL MOTOR OIL

. . . for more details circle 292, page 16

ROADS AND STREETS, April, 1957

Personals

Cement Association Changes

MARTIN A. LEWIS, assistant to the vice-president, Portland Cement Association, has been named to the additional post of coordinator of Interstate highway promotion for the Association with headquarters in Chicago. He will be assisted on technical aspects by Homer A. Humphrey, named senior highway consultant.

Leo H. Corning, formerly Director of Promotion Planning and Engineering Services for PCA was named to the newly created position of Chief Consulting Structural Engineer. His previous post is assumed by George H. Paris.

DATICS CORPORATION is the name of an organization formed at Fort Worth recently to take part in the fast accelerating work of scientific computing and data processing in highway, other engineering fields.

This young firm made up of youthful executives has established



Robert J. Ferguson

department heads for a digital computing group, data preparation group, and other major functions. Board chairman is Robert J. Ferguson, physics graduate of the University of Michigan. Kenneth L. Austin, a mathematics graduate, is president.

This firm represents a type of organization which heretofore has had its stimulus chiefly from the aircraft, guided missile and other such fields, and now is preparing more intensively to serve highway engineering.

WENTWORTH R. LOVERING is named district engineer for the Asphalt Institute at Sacramento, California. A 28-year veteran of the California Division of Highways, Wentworth succeeds Fred N. Finn who has taken a position with the AASHO test road project in Illinois.

Lovering will serve under D. A. Vallegra, division manager of the Institute at San Francisco.

F. C. WAGMAN of G. A. & F. C. Wagman, Inc. of Dallastown, Pa., has been elected president of Associated Pennsylvania Constructors. Max Hempt of Hempt Bros., Camp Hill, Pa., is vice-president and William C. M. Butler, Jr. of Central Pennsylvania Quarry, Stripping & Construction Co., Hazleton, Pa., is treasurer.

B. P. McWHORTER has retired as regional engineer for the Bureau of Public Roads at Atlanta. He was District Engineer for the Bureau at Richmond for a number of years. He is reportedly planning to join a firm of consulting engineers.

(Continued on page 108)

IF BLAST HOLES SLOWS CONSTRUCTION *here's the answer!*

PORTADRILL 6TA "CAT" MOUNTED ROTARY DRILL

The 6TA, mounted on a Caterpillar D6 current series diesel tractor, gives you the drilling speeds — and the *right size hole* — for blasting work in highway and other construction!

Completely unitized, the 6TA requires no auxiliary equipment. All drilling power is furnished by the tractor engine. Standard bits and faster drilling (up to 3' per minute of 9" hole in hard formations) together with one or two man operation keeps your blast hole work ahead of shooting crews — and your shooting ahead of earth moving equipment.

CUT BLASTING COSTS

When construction calls for "to grade" blasting or overburden removal, the 6TA is the drill that gives you the production you need.

Complete details on request.

PORTADRILL®

Manufactured by

The WINTER-WEISS Co.

2201 Blake St. Denver 5, Colo., USA



... for more details circle 326, page 16

for tough earth-moving jobs...



CUTTING EDGES

When you've got an earth-moving job that's mighty tough... when you *have* to have cutting edges that can take rough going—that's the time CF&I Cutting Edges really pay off!

For every CF&I Cutting Edge—whether it's for a scraper, grader, dozer or allied equipment—is carefully made from special analysis steel that's selected for its resistance to abrasion and fatigue, then scientifically hot rolled, punched and inspected to make sure it's perfect.

Next time you need cutting edges, make sure you investigate CF&I Cutting Edges. You'll find that they are available in a wide variety of lengths, widths, thicknesses and hole spacings; flat or curved, with beveled or square ends, and in different finishes. All are the products of CF&I's quality control that's complete from ore through finished product.

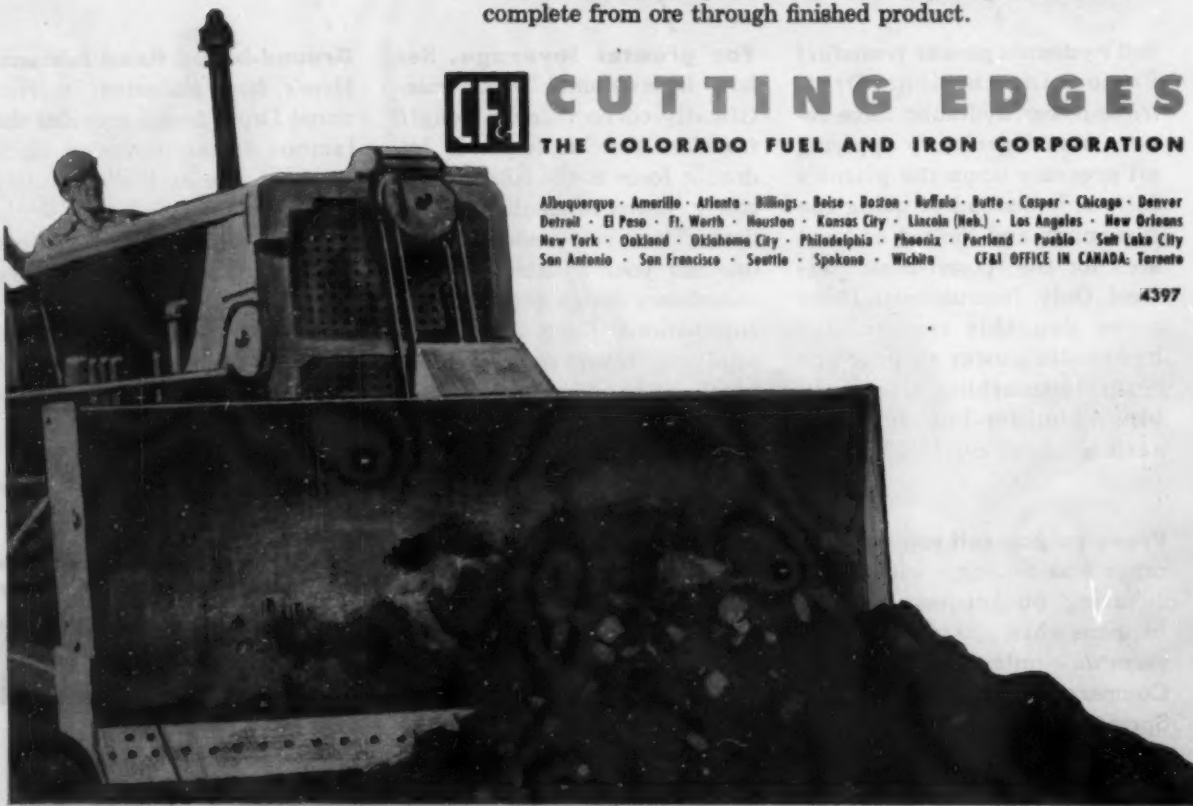


CUTTING EDGES

THE COLORADO FUEL AND IRON CORPORATION

Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver
Detroit • El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Neb.) • Los Angeles • New Orleans
New York • Oakland • Oklahoma City • Philadelphia • Phoenix • Portland • Pueblo • Salt Lake City
San Antonio • San Francisco • Seattle • Spokane • Wichita CF&I OFFICE IN CANADA: Toronto

4397

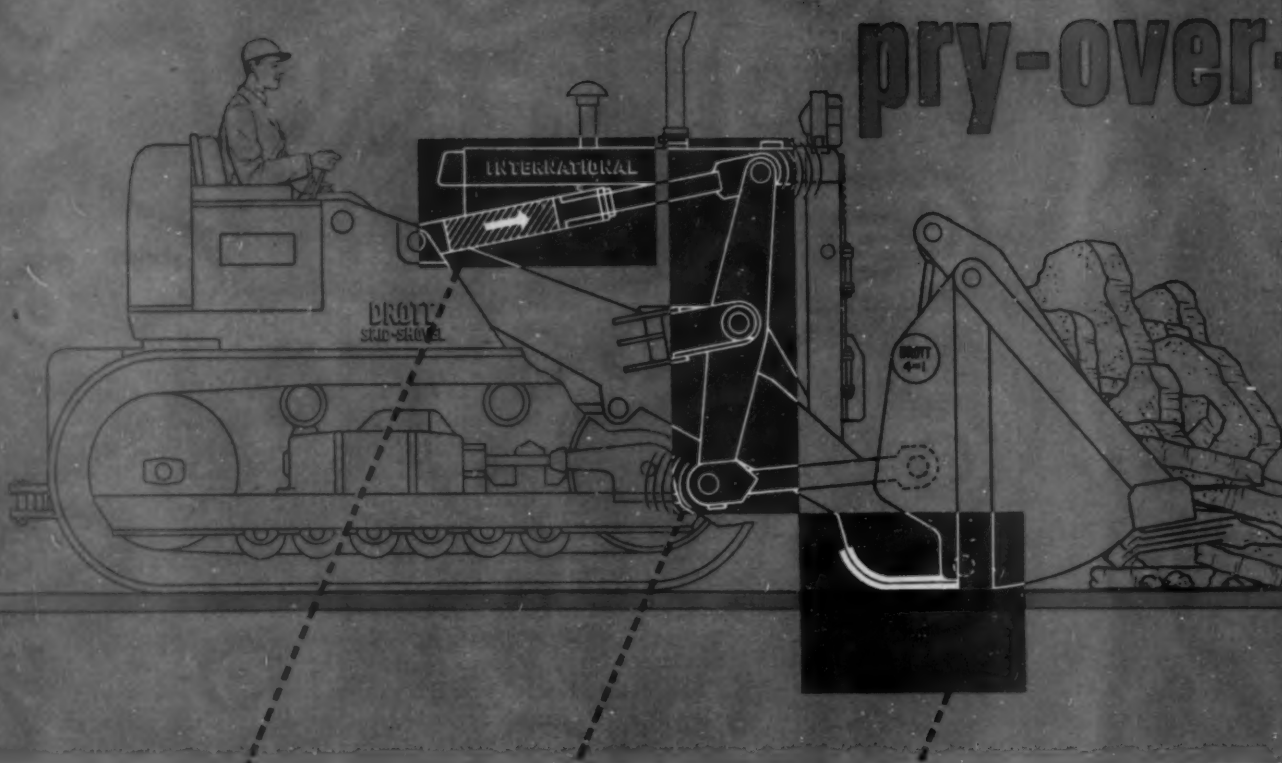


... for more details circle 227, page 16

ROADS AND STREETS, April, 1957

101

LET'S TAKE A pry-over



Full hydraulic power transfer!

Famous International Drott *triple-power* hydraulic force results from ingeniously applying oil pressure upon the piston's *full face*—instead of using the customary, and limited, rod-end area for the “power-push” surface! Only International Drott gives you this tremendous hydraulic power to produce concrete-smashing, tree-grubbing, boulder-bucking pry-action break-out!

Far greater leverage. See

how International Drott scientifically-correct *lever length* transfers *full* triple-power hydraulic force to the fulcrum. No costly power-dissipating “step-downs” here to lose one-fourth to one-half your hydraulic power, as ordinary design does! Instead, International Drott full power-applying leverage gives you tough-job-handling digging force and capacity ordinary loaders can't even begin to equal!

Ground-based fixed fulcrum!

Here's how exclusive International Drott design provides the famous frame-mounted skid-shoes—to act as the absolutely necessary *fixed fulcrum*. Without this, true pry-action break-out is impossible. The big *exclusive* International Drott skid-shoes provide the steady, ground-based platform for true ground-level bucket-heaping roll-back of 41°!

Prove to yourself you command a vast new job-range and capacity—with this super-powerful excavating, bucket-heaping pry-action. See what happens when you team this performance with the *versatility unlimited* of an exclusive Four-In-One. Compare how *exclusive* shock-swallowing Hydro-Spring “gentles” trouble-causing impact by 67%! Ask your International Drott distributor for a demonstration!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin



INTERNATIONAL®
DROTT®

CLOSE LOOK AT TRUE

-shoe break-out action

Only original and exclusive International Drott design transfers full hydraulic power to give you tremendous extra excavating force!

Genuine pry-action break-out has three absolute essentials: (1) *full hydraulic power transfer*; (2) *long lever*, to apply pry-power without power loss; (3) *fixed fulcrum*, located to concentrate break-out force for maximum effect.

Kuschler Construction Co., New Orleans, Louisiana, specializes in demolishing old service stations to be replaced with super-service stations.

Kuschler tore down this old station in one day, then removed the concrete work the second day—doing the entire job with their International Drott TD-9 Four-In-One!

Previously, the contractor demolished the buildings and

Here's how exclusive International Drott "separates the men from the boys" in heavy-duty loader design—and gives you front-end loader performance and capacity nowhere else available.

concrete with compressed air hammers and a three-man crew. Their other make of front-end loader, without true pry-action break-out, was limited to loading debris.

Now, one man, using triple-power International Drott pry-action break-out, accomplishes as much in one day as the three-man crew and four separate items of equipment were able to do in a whole week!





A-W Crushing Plant of J. J. Cronin Co., showing primary crusher at extreme left. Washer is in center of photo. Washed sand is delivered by the conveyor on left of washer, specification material by the three stock-piling conveyors at the right.

AUSTIN-WESTERN Crushing Plant giving high-speed production for J. J. Cronin Co., North Reading, Mass.

John Cronin reports: "We spent more than a month checking all makes before we purchased our Austin-Western plant in April, 1954. Since then, we have had every reason to be pleased with our decision. Production is fast, and we have very little downtime, as a result of the excellent engineering and rugged construction of the equipment. Present production includes: concrete sand and specification material in $\frac{1}{2}$, $\frac{3}{4}$ and $1\frac{1}{2}$ in. sizes."

In this operation, raw feed is delivered to a 36-in. feeder-grizzly combination and passes into the primary crusher, which has a jaw of 20 x 36 in. This is V-belt driven by a 75 hp slip-ring motor. The material is then conveyed to a 4 x 12 ft. single-deck screen. Larger sizes pass into a cone crusher,

which is V-belt driven by a 60 hp slip-ring motor. The washer is a 4 x 16 ft., 3-deck screen type, equipped with spray pipes. A single convenient push button station controls the entire closed-circuit system.

It will pay you to compare Austin-Western design and construction features before you invest in a crushing and screening plant. Each Austin-Western plant is designed to solve a particular production problem. Our engineers would welcome the opportunity to discuss your needs with you and to recommend the proper equipment.

See your nearby Austin-Western distributor today, or write to Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

AUSTIN-WESTERN
CRUSHING, SCREENING AND WASHING EQUIPMENT



BALDWIN-LIMA-HAMILTON
Construction Equipment Division — LIMA WORKS

OTHER DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation
Hamilton • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works

... for more details circle 208, page 16

Clipper

"SALES RIGHT THRU"

SUPERIOR BLADES

BEST for...

ALL SAWS
Any MATERIAL
Every JOB!

• YOU NAME IT...

The Saw - The Job - The Material

... Clipper will name the Best Blade to guarantee you the **FASTEST CUT**... at the **LOWEST COST**... with the **GREATEST EASE**—Anytime—Anywhere

FREE—A Clipper Factory Trained Representative will test cut any of your masonry, concrete or refractory materials **ON YOUR JOB** or in our laboratories—and recommend the exact specification for your job—without cost or obligation. Only Clipper, with its 20 years of leadership and experience, has the facilities for research and development which offers you the widest range of Blades in the world... Diamond, Wet or Dry Break-Resistant and Abrasive.



DIAMOND



BREAK-RESISTANT



ABRASIVE

• **WIRE - WRITE - PHONE** your Clipper Factory Trained Representative for **SAME DAY SHIPMENT** on Clipper Superior Blades or for blade recommendations for any materials. He can also arrange for your **FREE TRIAL** of a New 2 H.P. CLIPPER SUPERMATIC MASONRY SAW, the Greatest High-Production Masonry Saw ever built!



MANUFACTURING CO. • Phone Victor 2-3113 • 2800 Warwick • Kansas City 8, Mo.



MR. CLIPPER

ALBANY
Phone 8-0338
CHARLOTTE, N. C.
FRanklin 6-0257
DENVER
ALpine 5-6790
MILWAUKEE
BRoadway 3-5362
PITTSBURGH
EVerglade 1-6200

ATLANTA
MUrray 8-4229
CHICAGO
SUperior 7-1351
DETROIT
WOodward 1-7117
MINNEAPOLIS
FEderal 3-7629
SAN FRANCISCO
UNderhill 3-4324

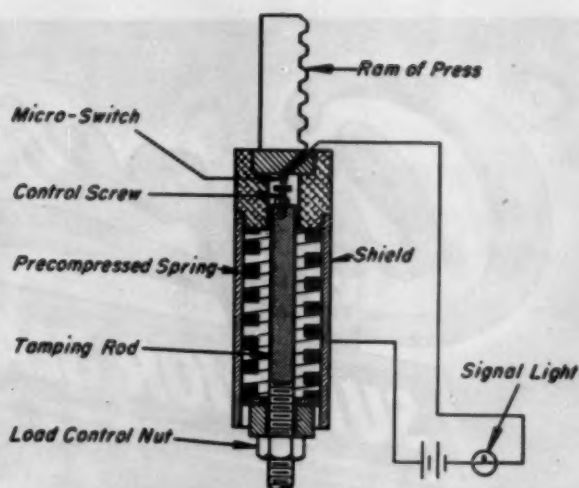
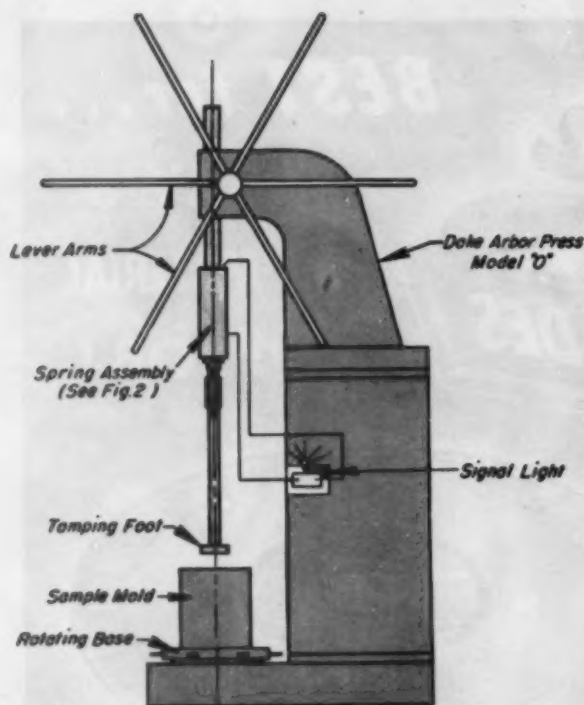
AUSTIN, TEX.
GReenwood 6-6555
CINCINNATI
CHerry 1-5720
HARTFORD
CHapel 7-5768
NEW ORLEANS
MAgnolia 5497
ST. LOUIS
MIssion 5-5530

BIRMINGHAM, ALA.
ALpine 2-8240
CLEVELAND
CHerry 1-7080
HOUSTON
CApital 5-6616
NEW YORK
MUrray Hill 7-8460
WASHINGTON, D. C.
REpublic 7-3087

BOSTON
HAncock 6-0512
DALLAS
PRospect 3491
INDIANAPOLIS
WAInut 3-8947
PHILADELPHIA
EVergreen 2-2962

FACTORIES IN ENGLAND, FRANCE, GERMANY, ITALY.

320X



- Above. Spring assembly for compactor.
- Left. Hand operated kneading compactor assembly.

California Institute Develops New Manual Kneading Compactor

A LOW-COST, hand-operated kneading compactor that can be used in the field as well as in the laboratory to produce soil and asphaltic-mix specimens large enough for pavement design purposes has been developed by the Soil Mechanics and Bituminous Materials Laboratory of the Institute of Transportation and Traffic Engineering, University of California, Berkeley.

A modified arbor press forms the main part of the unit. A spring between the ram and the tamping foot can be adjusted for the desired tamping pressure, and a signal light—indicating spring motion—tells the operator when he has applied the preset pressure. It has been found that this arrangement enables an operator, with a little practice, to repeatedly apply tamps of consistent time-pressure characteristics. Tests have shown excellent agreement between the results obtained from large automatic compactors and the portable hand model.

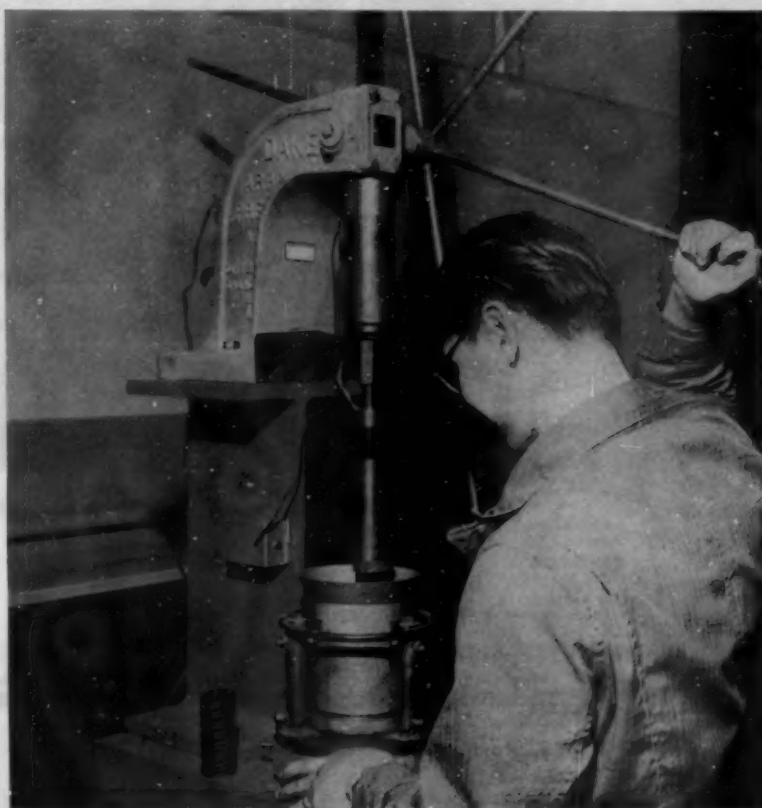
The design uses the principle

originally applied in the Harvard miniature compactor. But it permits preparation of 4-in. diameter

specimens at tamping pressures up to 500 psi, and 6-in. diameter specimens at tamping pressures up to 225 psi.

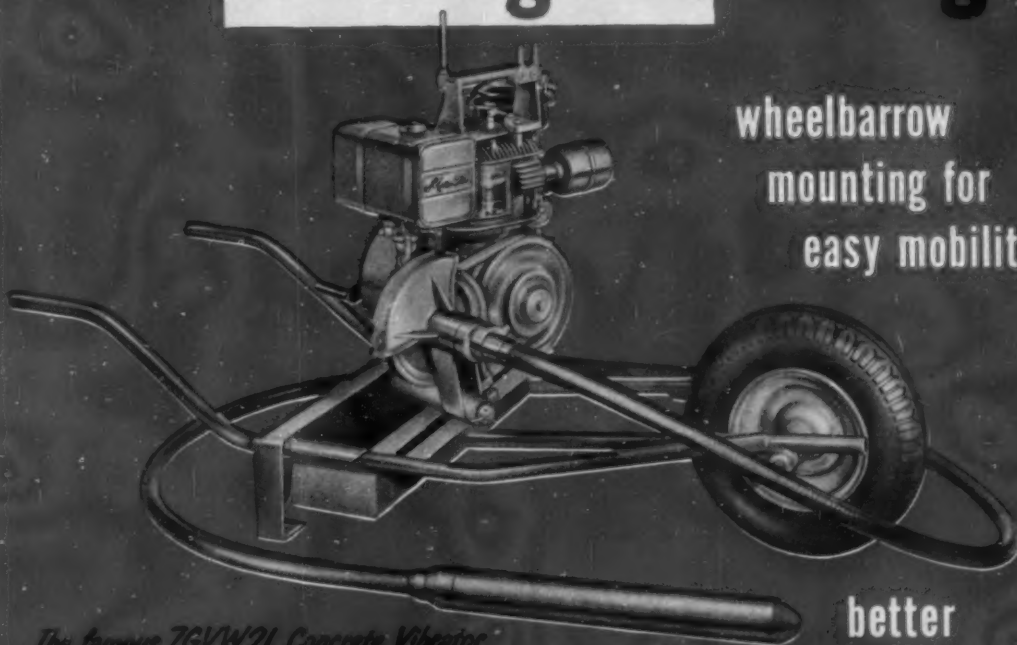
Details are given in ITTE Information Circular No. 27, by Prof. Harry B. Seed, Associate Research Engineer at the Institute, who was in charge of the development. Copies of the Circular are available without charge from the Institute of Transportation and Traffic Engineering, University of California, Berkeley 4.

- Kneading compactor in operation.



now, in concrete vibrators, too,

if it's Remington, it's right!



wheelbarrow
mounting for
easy mobility!

*The famous 7GVW21 Concrete Vibrator
has 4 great features that make it right for you!*

- Dependably powered by rugged single-cylinder, 4-cycle air-cooled gasoline engine with countershaft drive and automatic clutch.
- This versatile unit can also be used to power attachments for concrete surfacing, sanding, wire brushing, pumping and other jobs.
- Long-reaching flexible shaft made up of 7 ft. or 14 ft. sections. Extra sections can be added as needed.
- Unit can be moved right along with the work on pneumatic-tired wheelbarrow mounting. This unit is also available on 20" oval round base mounting.

better
concrete at
lower cost!

MODEL 7GVW21 5 HP concrete vibrator. Available with 2 1/2" x 20" 7,000 RPM vibrating head or 2 1/2" x 12" 10,000 RPM vibrating head.

Remington

MALL TOOL COMPANY
Division of Remington Arms Company, Inc.
25000 S. Western Avenue • Park Forest, Illinois

Mall



Electric circular saws are
best buys for every purpose



Electric impact wrenches speed
up work on heavy equipment

Specifications subject to change without notice.

... for more details circle 273, page 16

ROADS AND STREETS, April, 1957

You'll use less cement, coarser aggregate and produce denser, more uniform concrete...and do it in fewer man-hours!

That's a mighty big order to be sure! But it's being done every day on every kind of concrete job by these indispensable vibrators by Remington—the newest name in power tools and famous for 141 years for quality in sporting firearms and ammunition.

You name it...Mall Tool Company, Division of Remington Arms Company, Inc., gives you a vibrator for every application from small form work to large mass concrete compaction. Over a dozen models, most available in gasoline engine, electric or pneumatic, including the new 1-man 115-volt vibrator with motor-in-head. Let us send you our latest catalog today!

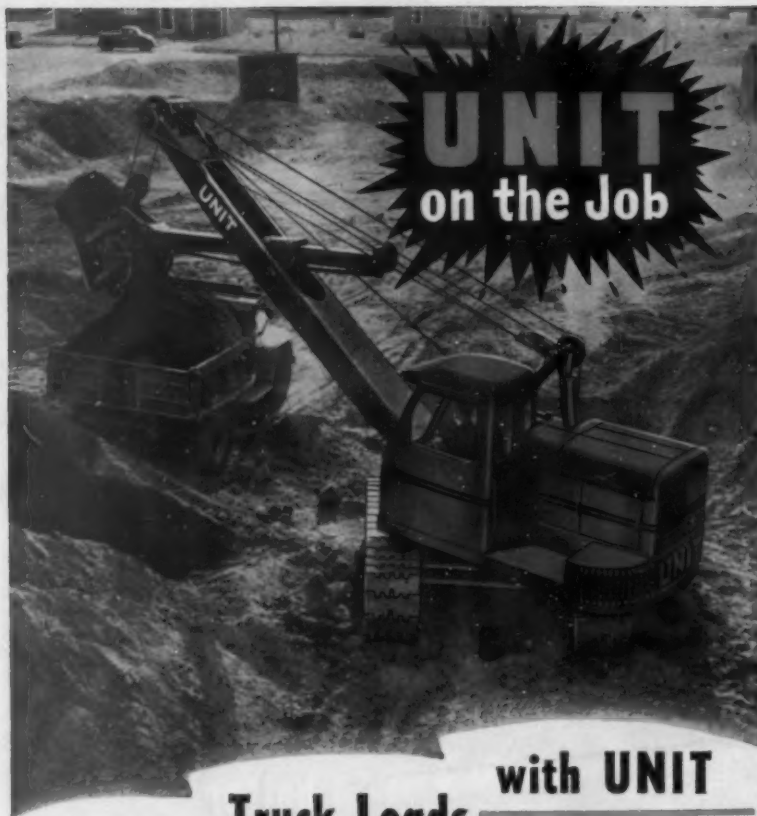
MALL TOOL COMPANY
• Division of Remington Arms Company, Inc., Dept. B33
• 25000 S. Western Avenue • Park Forest, Illinois

• Please send free catalog on Construction Tools.

• NAME

• STREET

• CITY ZONE STATE



Step-up Truck Loads with UNIT

Here's a UNIT $\frac{3}{4}$ yard Shovel that's "in there swinging" . . . making big payloads. UNIT'S balanced stability and power permit hard digging . . . produce maximum yardage at low operating cost. Fewer working parts cut down replacements required . . . reduce maintenance costs. The FULL VISION CAB enables operator to see in ALL directions . . . promotes safety . . . increases efficiency. Results in more loads per day and easier load handling. Get the complete UNIT story. Write for literature.

UNIT CRANE & SHOVEL CORPORATION
6407 WEST BURNHAM STREET * MILWAUKEE 14, WISCONSIN, U. S. A.



**$\frac{1}{2}$ or $\frac{3}{4}$ YARD EXCAVATORS...CRANES UP TO 20 TONS CAPACITY
CRAWLER OR MOBILE MODELS . . . GASOLINE OR DIESEL**



All Models Convertible to ALL Attachments!

. . . for more details circle 310, page 16

Personals

(Continued from page 100)

H. C. SAVIN has been elected vice president of Merritt-Chapman & Scott Corporation for the company's construction department. Savin has been a vice president for the past eight years of the Savin Construction Company of East Hartford, Connecticut, now a part of M-C&S.



Herbert C. Savin

CLAUDE F. SKIDMORE is appointed district engineer in the new Asphalt Institute office being opened at Lansing, Michigan, for serving Michigan and northern Indiana. Recently sales engineer for a Toledo building supply firm, Skidmore was previously on the engineering staff of the American Bitumuls & Asphalt Company, and served as a field engineer for the Ohio Department of Highways and as a county engineer in Ohio.

He will work under John Goshorn, division Managing Engineer of the Institute at Columbus.

CARL T. BOWEN, retired engineer-manager of the Ottawa County road commission in Michigan, died recently in California. He had served 34 years in his job and was known as the dean of Michigan road engineer-managers. He was a state leader in highway development and a past president of the Michigan Good Roads Federation.

ROBERT H. KLUTCHER is appointed district engineer for the Pennsylvania Department of Highways at Harrisburg, succeeding Victor B. Leopold, who has joined the department's central office bureau of Project Development. Klutcher was formerly assistant district engineer.

What Your Staff Should Know About TIRE SELECTION AND CARE



...for Earthmoving and Construction Efficiency

by Frank W. Fox

Truck Tire Dept., Goodyear Tire & Rubber Company

Which optional tire size? Which tread? What about tubeless or wide-tread tires? Ply ratings? Here are some of the facts contractors need to know about the new, superior tires on the market today—plus suggestions for maintenance and repair of off-road tires, and job use of rubber-tired equipment for best efficiency and profit.

THE intense competition among contractors for the expanding construction activity on roads, airports, dams, etc., is prompting more contractor attention to the important factor of tire costs.

The modern construction machinery is practically 100 percent pneumatic tire equipped. Because of higher powered motors, greater possible speed, greater load capacity and improved operating controls, tires necessarily are larger, more specialized and more expensive, so deserve increased attention if the cost is not going to eat unduly into job profits.

The successful contractor recognizes the importance of his tire problems, which can be grouped under three main classifications:

1. Selection of the right tire for his equipment and the particular job under consideration.
2. The manner in which the job is laid out and the vehicles are operated.
3. The specific care given the tires, to secure protection against injury in service, against deterioration in storage and against premature failure by removal at the proper time for possible repairing or recapping. Each of these three subjects will be dealt with in this review.

CHOOSING RIGHT TIRES FOR JOB'S DEMANDS

Proper tire selection must be exercised at the time the equipment is bought. If the purchase is made prior to the beginning of a big specific job, tire size, strength and tread types should definitely be specified to the vehicle manufacturer.

If, on the other hand, the vehicles are purchased for general use over a period of time on various jobs, then the general character of the probable work should be the guide as to whether the contractor takes standard tire equipment or specifies some of the options which are available.

These options as mentioned above are (1) tire size, (2) tire strength or ply rating, and (3) tread design.

● (1) *Tire Size.* Whereas in the case of small and medium-size trucks, clearances, gear ratios and other factors in the vehicle design generally permit the use of an over-size tire when extra heavy loads are to be carried, the same is not always true with heavy machines made for the construction industry.

Frequently, however, the manufacturer offers options in tire size, and will provide the axles, wheels, proper width rims, and also handle clearance difficulties to accommodate extra large tires if the machines are ordered with such a specification.

Average payloads in the bodies furnished on most earthmoving vehicle models, fully load the tires to recom-

mended capacity. But in many cases, it is not difficult to carry loads in excess of the Tire and Rim Association recommended figures. Often extra heavy material is involved in the job, or the operator wants to add side boards to the body. In such cases loads on one or more axles may be greatly in excess of recommended loads for the standard tire equipment.

If, in such cases, the vehicles are purchased with the oversize tires, the operator will, in spite of the increased first cost, wind up with lower tire expense over a period of years. The tires that are given proper load consideration—which means keeping the weight on each tire reasonably close to Tire and Rim Association recommended figures—will give greater service and lower costs.

● (2) *Optional Ply Rating.* When contemplating extra loads, sometimes it is not possible to secure oversize tires as original equipment, or practical to cut down the wheels, or to apply new rims and change to such oversize tires. In such cases there often is the possibility of getting tires of different strength which—by increases in inflation—will satisfactorily handle higher loads.

For several years the standard cord material used in large earthmoving and grader tires has been Nylon—a material greatly superior in strength and durability to the cotton and rayon used in the earlier tires. This cord is, on the basis of weight, stronger than steel wire. It permits the fabrication of much stronger tires without added thickness, and makes it practical to build tires of a number of different ply ratings in the same size to fit the same rims, and to operate on the same vehicles without changes of ground clearances, gear ratios, etc.

There is, for instance, in the case of 18.00-25 tires, the chance to change from an original equipment tire, say to 20 ply rating, to tires of 24 or 28 ply rating which are much stronger.

Whereas in earthmoving service with a maximum speed of 30 mph, the 18.00-25 20 ply rating tire has a maximum recommended load of 14,308 lb. with 50 psi pressure, the 24 ply rating tire may be loaded to 16,000 lb. with 60 psi inflation and the 28 ply rating tire to 17,500 lb. with 70 psi pressure.

Tire company representatives have full information on the options of this kind. Since changes in ply ratings most frequently are considered as a result of trouble with the original-equipment tires, advice and service in this regard are readily available to the operator.

● (3) *Tread Design.* In the various



● All-Nylon Hard Rock Lug Wide Base Earthmover. The new design, low-pressure, wide base Hard Rock Lug is constructed for wider rims and provides superior flotation under all conditions.

manufacturers' lines of earthmoving machines some models are designed for soft ground operation, others for rock work. In meeting the tire requirements of such variations of models, it has been necessary to develop different tread designs which have varying elements of traction efficiency, on the one hand, and resistance to cutting and snagging on the other hand.

Obviously in soft dirt, especially where wet conditions exist, maximum traction is desirable. For greatest efficiency a bar-type tread, rather widely spaced to permit a good "bite" into the hauling surface, is preferable.

Where dry, sandy soil is encountered the emphasis is on flotation and the ability to stay on top of the surface without disturbing it. For this type of service it is best to have an all-over pattern, without transverse components which would tend to scrape away the underfooting in the case of wheel slippage. This type of tire tread is also most satisfactory for free rolling wheels, and for operation of large earthmoving vehicles on hard roads where neither extra traction requirements or severe cutting hazards are present.

When rocky going is encountered and when abrasion is severe, best performance is secured with an extra volume of tread rubber in heavy components which shield the cord body and sidewalls against snagging and cutting, and give long wear under the most severe conditions.



● Hard Rock Lug. Used primarily for rock excavating, mining and quarrying.



● (Left): Earthmover Sure-Grip. Good traction for big loads in soft, muddy and slipping going.

● (Right): All-Nylon Sure-Grip Lug Wide Base Earthmover. Built for the new, wider rims, these wide base, low pressure tires have improved flotation to allow faster, constant operation of big equipment.

NEW WIDE BASE EARTHMOVER TIRES

In addition to tread type variations there has also been recently introduced an entirely new type of tire called Wide Base which gives improved flotation, greater cushioning and the ability to maintain higher speeds through rough going. These Wide Base tires are made in sizes corresponding to the standard earthmover tires in sizes 16.00 and up as follows:

Wide Base 23.5-25	replaces 18.00-25
" " 26.5-25	" 21.00-25
" " 29.5-25	" 24.00-25
" " 29.5-29	" 24.00-29
" " 33.5-33	" 27.00-33

These tires are made in both traction-type and rock-type treads, which are varied somewhat from the tread patterns used for standard type earthmovers.

In line with increasing the efficiency of earthmoving operations, major manufacturers are moving rapidly to the use of this new type Wide Base equipment as wheel and rim and vehicle clearance problems are overcome.

TUBELESS EARTHMOVER AND GRADER TIRES

Also of major importance in 1957, is the announcement of the development of tubeless tires for earthmoving equipment of all types. The move to eliminate the tube started with passenger car sizes and truck pickup sizes several years ago. This was followed late in 1955 by the introduction of

tubeless sizes for highway and small dump trucks. All tires for these light and medium trucks ranging in cross section from 6.00 to 11.00 were made to fit one-piece drop center rims.

For the former 7.50 through 11.00 sizes it was necessary to redesign the tires and to introduce new rims, whereas for the smaller sizes it was only necessary to make airtight tires to fit the one-piece rims already used as standard equipment.

In the 7.50 through 11.00 sizes it was necessary to completely change tire size markings, inasmuch as both cross section and bead diameter were changed by the adoption of the new type rims. In this group, for instance, the old 7.50-17 became 8-19.5; the 8.25-20 became 9-22.5 and the old 10.00-20 became 11-22.5.

The larger highway and regular dump truck sizes 12.00 through 14.00 could not satisfactorily be used on one-piece rims, because their heavy bodies and beads did not permit easy mounting. In these sizes it was found possible to put an airtight tire on a two-piece rim with tapered bead seats which had the air locked in by means of a sealing ring.

Because of the change to tapered beads it was necessary to change one figure of the tire markings, as for instance, the 12.00-20 became 12.00-21 and the 14.00-24 became 14.00-25.

● For the grader tires and the earthmovers which already had tapered bead seats it has been possible, by a slight modification of the rims, to permit the addition of a rubber sealing ring to provide tubeless tires which have the same markings as the old tube type tires.

The former valve slot which was necessary with a tube has been eliminated. As is the case with all tubeless tires, the valve is fastened directly in the rim base.

This tubeless assembly offers many advantages to the construction industry. Chief advantage is the elimination of troubles formerly encountered because of tubes and flaps, which were hard to get mounted right. Often due to pinching and misapplication the tubes and flaps caused up to 80 percent of the vehicle delay and expense due to tires.

The tubeless tires are easier to mount; there is no extra material between the beads and they are less likely to fail by blowouts when injured. A cut or break, no matter how small, will permit the escape of air, whereas with tube-type tires a damaged casing would be kept in service until the injury had grown sufficiently to break wide open or pinch the tube.

These "slowout" instead of blowouts permit the vehicle to be driven to a service point where the tire can be more readily changed when necessary instead of having to do it on the job as in the case of the tube-type failures.

● *Tubeless are Cooler.* Tubeless earthmover tires run cooler. In these days of higher-powered motors and faster operating speeds, this may be an important (Continued on page 116)



● All types of this design (Goodyear Earthmover and grader tubeless tires) fit multi-piece rims, rubber sealing rims.

3 Payhauler® Units match 4 competitive rigs on "W.Va.'s most dangerous road job!"

**Earn 25% equipment saving
...33% production gain for
Acme Construction Company,
Bluefield, West Virginia**

In the mountain-rugged, rough and rocky country of southern West Virginia, three International "65" Payhauler trucks are doing the work of four similar competitive units...on the same job...under the same tough conditions. The location is Welch, where Acme Construction Company of Bluefield, is moving 100,000 cubic yards of rocky material "clover-leafing" U. S. Bypass Route 52...labeled by Jim Chase, superintendent, as "West Virginia's most dangerous road job"

All haul units on the job are in the same capacity and power class. They're all loaded by a 1½ cu yd shovel...they all travel the same ½-mile to the fill and the same return route. Yet, the Payhauler trucks because of their ample, turbo-charged diesel power, plus load-matched gear ratios, smooth the get-away—and permit quick shifting into time-gaining, hill-climbing higher gear! This performance under rough and rugged conditions has caused Jim Chase to say, "We get the same production from 3 International '65' Payhaulers as we do with our four other units...a 25% savings in equipment, a 33% gain in production."

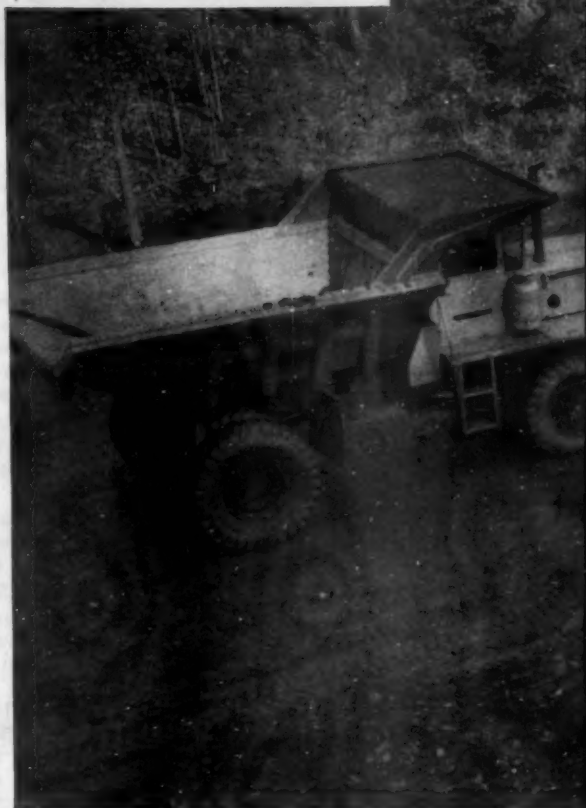
Prove to yourself how much an International "65" or "95" Payhauler will boost your off-highway hauling capacity. Try its safe and easy full-load maneuverability. Test the power-transfer efficiency of its long-lasting Cerametallic-faced clutch. Ask your International Construction Equipment distributor for a demonstration!



**INTERNATIONAL
CONSTRUCTION
EQUIPMENT**

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Side-Boom Tractors
... Self-Propelled Scrapers and Bottom-Dumps ... Crawler and Rubber-Tired Loaders
... Off-Highway Trucks ... Diesel and Carbureted Engines ... Motor Trucks



International TD-24 dozes shot-rock down the slope to 1½ cu yd shovel and easy-loading International "65" Payhauler. 250,000 pounds of dynamite were used...about a pound to every 3 yds of rock!





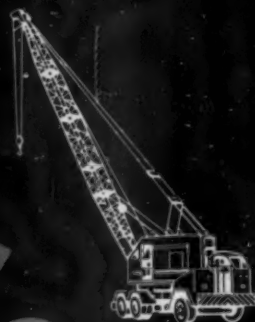
Ample power from a 250 hp Turbo-charged engine drives the model "65" at production-boosting speeds...with fuel consumption savings of 10% or more. Ten-speed transmission gives right gear for every grade...every road condition.

Double acting hoist cylinder in all stages with 106,300 pounds of force in first stage permits dumping heaped loads in less than 10 seconds. Hydraulic snubbing action prevents undue stress on hoist cylinders and "gentles" body return to frame.

Strongest frame in its class and big 10 x 14 foot high tensile steel Payhauler body permit faster, more carefree loading of rock or other tough materials. Model "65" Payhauler body gives you big, profit-boosting, 18-ton capacity, model "95" a husky 24 tons.



FROM TIMKEN-DETROIT...

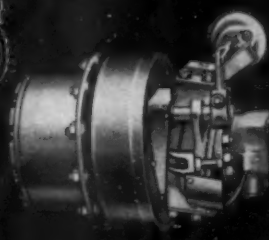


today's

BROADEST RANGE



OF



PLANETARY AXLES

... both steering and rigid!

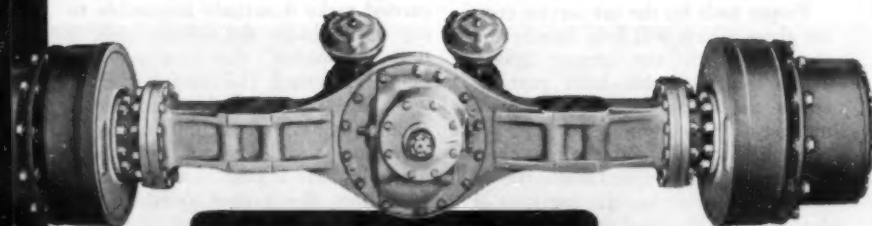
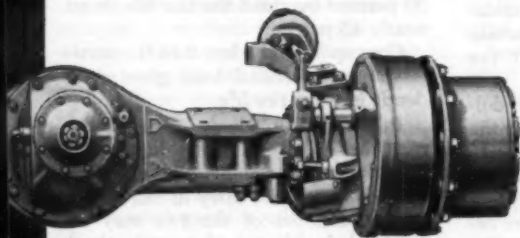


FOR HEAVY-DUTY SPECIAL EQUIPMENT AND TRUCK APPLICATION

The Timken-Detroit family of advanced design axles now includes a complete range of new planetary heavy-duty axles—with a steering axle operationally matched to each rigid axle in the line.

Versatility, ruggedness, and almost unlimited gear reductions make these new planetary axles the leaders in their line. They are going into use in practically every corner of the world on heavy-duty two- and four-wheel drive prime movers, husky off-road rock and earth wagons, big four-wheel tractors, mining equipment, heavy-duty scrapers, front-end loaders and many other units of heavy-duty equipment.

Years of TDA® research and development have brought these new and exclusive planetary outer-end features: floating ring gears—concentrically mounted ring gear hubs—full-flow lubrication of all bearings and planet gears—special forged bronze planet pinion pins—and an unusually high degree of parts interchangeability. For the newest and finest in planetary axles—depend on Timken!



Only New Timken® Full Planetary Design Brings You These Features for Extra-Long Life, and Extra Dependability:

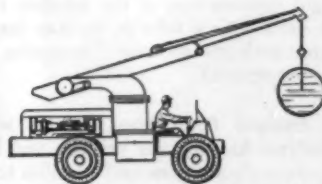
1. NEW FLOATING RING GEAR and hub are two separate pieces. Ring gear is free to float radially. This feature, combined with floating sun gear, assures equal distribution of stresses to all planetary gears, gives longer, trouble-free gear life.

2. CONCENTRICALLY GROUND RING GEAR HUB AND SPINDLE MOUNTING SURFACES ground around a common center assures perfect alignment and fit—plus freedom from bending forces on the hub and spindle splines. Splines absorb only torsional stresses from the ring gear and transmit them to the housing.

3. SPECIAL FORGED BRONZE PLANET PINION PINS of premium alloy bronze for longer, trouble-free operation. Rifle drilled lubrication channels and machined lubrication flats assure full time lubrication. When cover is assembled pin is locked in place to prevent rotation—resulting in longer pin life.

4. FULL-FLOW LUBRICATION design of Timken planetary axles assures constant flow of lubricants to wheel bearings and all planet gears while vehicle is in operation. Wheel hub and planetary spider pick up oil in the cast reservoirs as they rotate and channel it to all moving parts. When vehicle is not in motion oil is retained in these chambers providing ample initial lubrication.

5. HIGH DEGREE OF PARTS INTERCHANGEABILITY between both rigid and steering axles in the same series. This means a smaller parts inventory, low maintenance costs and more productive time with Timken planetary axle equipped vehicles.



Plants at: Detroit, Michigan • Oshkosh, Wisconsin
Utica, New York • Ashtabula, Kanton and Newark, Ohio
New Castle, Pennsylvania

**WORLD'S LARGEST MANUFACTURER OF AXLES
FOR TRUCKS, BUSES AND TRAILERS**

©1957, RS&A Company

... for more details circle 307, page 16



● New Hydraulic tool for changing earthmover tires, developed by Goodyear. Tool is known as the TO-100.

TIRE SELECTION, CARE

(Continued from page 111)

portant factor in preventing excessive heat and pressure build-up in tires. The operator faced with the necessity of buying a few new machines to add to his fleet need not hesitate about specifying tubeless tires, even though this would mean a small percentage of his tire equipment was of this type.

As the tubeless tires are on demountable rims, the rims will fit the same wheels as tube-type equipment—the only variation being the necessity of a narrower spacer of duals.

If the tube-type equipment has rims integral with the wheels, and spare tires are on hand unmounted, it will only be necessary to buy tubeless spares after the stock of tube-type spares has been exhausted. This is because the tubeless tires can be used with a tube on the rims provided for tube-type tires. Bead diameters and all dimensions are the same, and the airtight construction of the tubeless tire as used with a tube in no way interferes with the successful operation of the equipment.

● **Analysis Pays.** The operator who analyses his jobs, his vehicles and his operating conditions and specifies tires of the right size, strength and type, will have the best chance for low tire costs. This important part of the tire problem should never be overlooked in the purchase of new equipment—or at the start of a new major project which may vary considerably from that on which the equipment was previously used. Original equipment tires,

or tires changed over before the job starts, of the proper sizes and types, are real insurance for good tire performance.

The contractor who properly selects the tires for his equipment and with due consideration for the job he is about to undertake, can assure himself of good tire performance. This he can do by arranging for and *vigorously following through* on good maintenance of those tires for duration of the job.

The first essential of good tire maintenance is the combination of intelligent supervision and competent tire service men.

Considering the thousands of dollars' worth of rubber used on the average project, the tire maintenance crew should be selected with the utmost care since their responsibility is a heavy one. In many cases, the tire expense is practically as great as the vehicle upkeep expense, and in excess of other items which many times are watched much more carefully.

Proper tools for the tire service crew are those which will help handle tire changing with the utmost speed. These include hoists—both portable and in the shop—to ease the strain of moving tires, many of which now are in the half-ton to one-ton weight class. Another important speed tool is the air wrench for loosening the lug nuts or demountable rims and wheel hubs.

Pneumatic tools to remove tires from rims are also available and will greatly speed up operations reducing the time and hence the cost of tire changes. These tools save both man-hours of labor and yardage otherwise lost through longer down-time.

Adequate supplies of spare tires, valves, rims and other necessary items

should be on hand at all times. The cost of carrying the necessary investment is small compared to the cost of having vehicles costing \$25,000 to \$60,000 each laid up waiting for a minor item of the tire or wheel equipment.

Care for the tires in operation involves many factors, most of which are well understood by competent tire service men. *Rigid following of everyday rules of tire care is more a matter of carrying out a program than of working out any elaborate service set-up.*

Chief among the factors which affect tire life in the operation of a job are the following:

1. **Loads.** For each tire there is a maximum load recommended by the Tire and Rim Association, with its corresponding inflation, which gives a reasonable chance of long life and low cost.

If—due to certain circumstances—an operator can overload and, even through disregarding higher tire costs, make a greater profit, it would, of course, be a good thing to ignore these recommendations.

It should be kept in mind, however, that the tire life decrease is greater than the percentage of overload. Experience has shown that at 10 percent overload, tire life may be cut by about 18 percent; at 20 percent overload the decrease in tire life is 30 percent; with 30 percent overload the tire life drops nearly 45 percent.

Correspondingly, less than the maximum recommended load gives dividends in extra tire life.

In cases where duals are used, the matching of tires of equal diameter is important. The small tire of a pair on one wheel will not carry its fair share. Thus the larger of the two may be overloaded although the total wheel load is normal.

The variations in the unit weight of different types of soil and materials carried make it entirely impossible to say that because the vehicle body is not "overloaded" the tires are not being mistreated. The careful operator will get scale weights frequently enough to have an accurate check of individual tire loads on his various machines. He is thus in a position to give tires the proper consideration from the standpoint of the work they are being expected to do.

● **Inflation.** In the recommendations of the Tire and Rim Association, it will be found that for each recommended load there is a matching inflation, designed to keep the tire rounded out under the load to the proper degree.

Too much air increases the strain on

the body cord, making it more susceptible to bruising and cutting, and narrowing the tread contact so that excessive wear may be incurred.

Too little air permits extra flexing which develops excessive heat, often leading to blowouts and early complete failures. In any case, over-inflation results in undue motion in the tread, with resulting uneven tread wear.

Inflation checks should be made often enough to prevent tire pressures from dropping as much as 10 percent. The time between checks may vary for different tire sizes and types. Each tire supervisor should have a schedule worked out by experience for his own vehicles, and then see to it that this checking program is carefully carried out.

All tire gauges cannot be depended upon for reliable results over long periods of time. Each contractor with a lot of dollars tied up in rubber should buy a master tire gauge with which to check his ordinary gauges. Thus he can periodically make sure he knows that the inflations actually being carried are right for his tire equipment.

● **Job Conditions.** Many other items of equipment and job operation too numerous to mention can seriously affect tire performance. Some of these are: poorly maintained haul roads, spinning of drive wheels when loading scrapers, mechanical irregularities causing tires to run out of line or rub on various parts of the machine, etc.

All these careless practices have their effect on tire life, though many of them do not cause any visible changes in the tires' condition at the time the tires are being abused.

A careful operator will eliminate the chances for early tire failures by giving careful consideration to good operating practice and care of the rubber on the job.

LOAD INFLUENCE ON TIRE MILEAGE

Load Condition		% Increase or Decrease In Mileage
Underloaded	30%	Plus-100%
Underloaded	20%	Plus- 61%
Underloaded	10%	Plus- 29%
Loaded at Rated Capacity		0%
Overloaded	10%	-18%
Overloaded	20%	-30%
Overloaded	30%	-42%
Overloaded	40%	-52%
Overloaded	50%	-60%

● **Repairing and Recapping.** Regardless of the fact that tires may be properly selected to fit the requirements of the job, and operating care may be of the highest order, tire injuries of both major and minor degree may be received at any stage of the operation.

Rubber is not as tough as rock and metal. Especially when wet, it can be cut by sharp edges—ordinarily, however, the great tread thickness comes to the rescue—many injuries do not extend into the cord body; even if a few plies are injured, the remaining strength is adequate to carry on.

Certain types of cuts which may extend only to the rubber are liable to form pockets into which small stones and dirt become packed. With each revolution, such plugs of foreign material are driven in deeper.

Such neglected injuries can, in time, cause large pockets of separation of tread and cord body, or may even damage the plies sufficiently to cause tires to blow out.

Sound practice suggests that cuts which may develop into pockets be skived out to eliminate the chance of material lodging in them. The amount of rubber which must be cut away is insignificant in comparison with the potential damage which may result if

this kind of attention is not given to deep tread cuts.

Injuries which extend into more than the outer plies of cord should, of course, be removed as quickly as possible, so that vulcanized reinforcements can be made. Such repairing will restore the strength of the injured part of the tire, and generally will per-

(Continued on page 121)

- (Left Below): In operating the TO-100, tighten securely the adjusting screws at bottom of tool's jaws. Set hand screw against lock ring and adjust until jaw assembly is in a right angle position to the plane of the flange.
- (Center Below): With spade tip down and ram in retracted position, insert spade and ram assembly between open sides of frame. Place spade tip between tire bead and rim flange. Lift ram until trunion engages frame shoulder support and move stop screw into support ram.
- (Right Below): Move to spot approximately 90 degrees from first application (either direction) and repeat entire procedure. Then continue repeating procedure until tire is freed from rim. Four to five applications usually accomplish this.

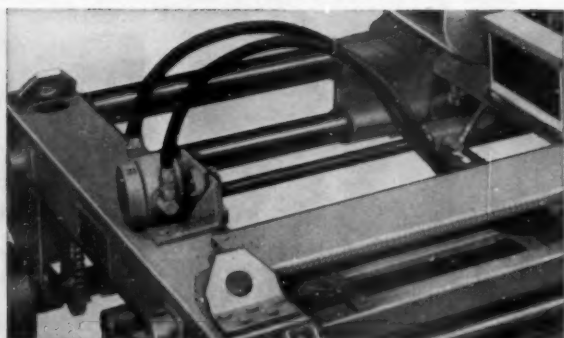


ALL HYDRAULIC OPERATION: 5 gear-type pumps smoothly power all operations. No mechanical transmissions or clutches are used.

FINGER-TIP EASE OF CONTROL: With banked levers operator controls traction, screeds, screed lift, rear screed swing and tamper.



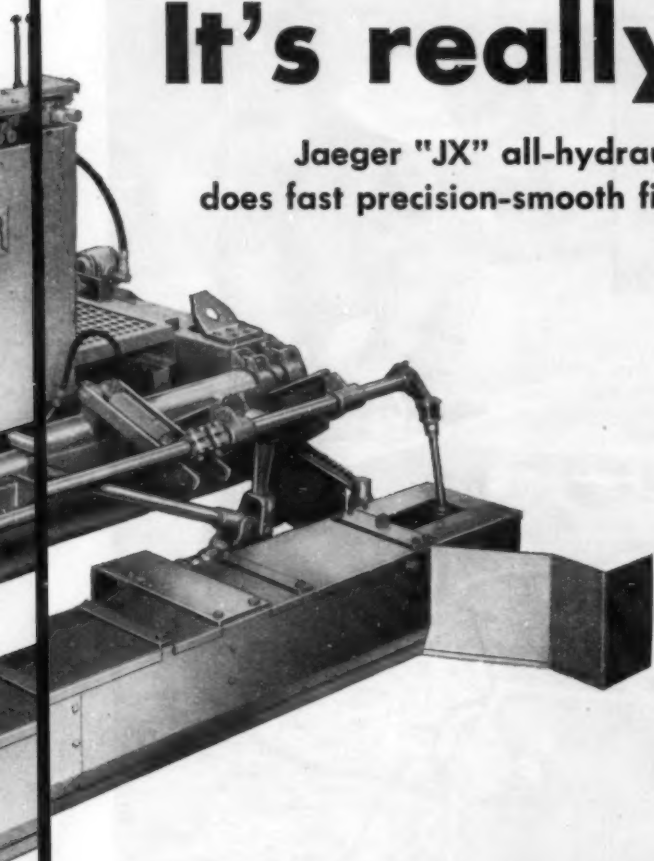
ONE MOVEMENT CHANGES SCREED CROWN: The quick turn of a lever uniformly raises or flattens entire screed to desired setting. Big advantage on curves.



6' OF INFINITE WIDTH ADJUSTABILITY: Hydraulic power extends telescopic tubular frame any width up to 3' on each side — 6' total.

It's really smooth

Jaeger "JX" all-hydraulic self-widening finisher
does fast precision-smooth finishing under finger-tip control



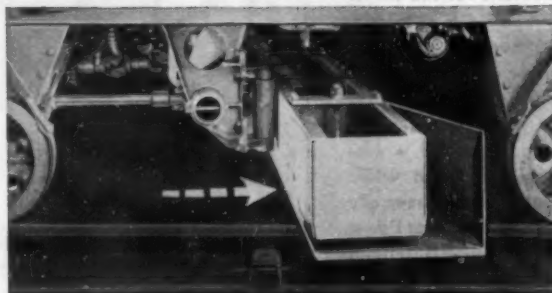
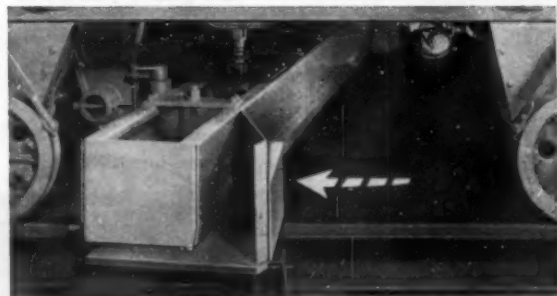
Everything is hydraulic. You make width changes up to 6' and perform all travel and screed operations, including diagonal setting of the rear screed, with the touch of hydraulic levers. No mechanical transmissions or clutches. Even the tamper attachment and transportation wheels are hydraulically operated.

6' of infinite width adjustability in each size: 12'-18' and 24'-30' standard widths; special widths from 9 to 30' available.

Diagonal rear screed, hydraulically adjustable, lays material solidly against higher form on pitched slab and super-elevated curves. Quick crown change uniformly crowns entire screed with one lever movement. (Conventional screeds, including transverse rear screed, can be furnished if desired.)

Your choice of vibratory "bullnose" front screed or vibratory pan or tube attachments. Traction wheels for every condition.

The flexibility, speed and precision smoothness of the Jaeger "J" and "JX" finishers give you a big advantage on this year's work. See your Jaeger distributor, or write us, today, for complete information.



HYDRAULIC POWER SETS SCREED ANGLE: With a light touch, operator swings rear screed to any angle needed for up-hill finishing on pitched slab or curves.

... for more details circle 256, page 16

ROADS AND STREETS, April, 1957

JAEGER

THE JAEGER MACHINE COMPANY

223 Dublin Avenue, Columbus 16, Ohio

Jaeger Machine Co. of Canada, Ltd., St. Thomas, Ontario

Sales and Service in More Than 150 Cities of U.S. and Canada
and Principal Cities of the World

SPREADERS • FINISHERS • AIR COMPRESSORS • PUMPS • CONCRETE MIXERS

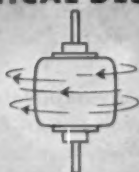


TEAMS BEST WITH JAEGER SPREADER: Screw-type spreader (with oscillating metering screed if desired) makes ideal combination for fast laying of slab.

ANNOUNCING

the first major improvement
in generator design in 25 years

REVOLUTIONARY VERTICAL DESIGN



*Spins
like
a top*

Entire weight of generator armature supported by the tubular frame. Engine and main bearing turn the armature—do not support it. Generator spins best on vertical axis—lasts longer.



OLD DESIGN

Generator weight exerts loads on engine shaft and bearings. Causes more wear than in Thor's vertical mounting.



New Thor generator powering a Thor 7 1/4" SpeedSaw hastens construction of the new Congress Street Expressway in Chicago.

ALL NEW THOR PORTABLE GENERATOR

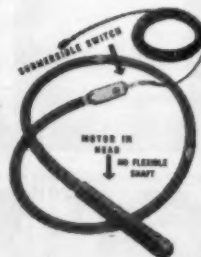
Here's the brand new look in generator design—Thor's all-new 1500 watt portable engine-driven generator with vertical mounting.

This handy, compact power plant—available in AC and DC models—is the real answer to the builder or contractor who needs a rugged, portable power source. Check these features, then check your Thor distributor for a demonstration. • Revolutionary design—vertical shaft

engine • Light weight—95 lbs. Strong tubular framework protects unit, assures handling ease. • Heavy duty automatic rewind starter—easily removable for repair. Off-on toggle-type switch. No shock danger • Drip-proof construction—keeps fuel and moisture from entering generator • No-creep—stays put while running, yet slides easily when moved. Thor Power Tool Co., Prudential Plaza, Chicago 1, Ill.



ANOTHER FIRST FROM THOR Universal Electric Motor-in-Head Concrete Vibrator



Model CV2-10 has 10-foot hose and switch • Model CV2-20 has 20-foot hose and switch. • Model CV2-210 has 10-foot hose on each end of switch. All models include 25-foot 3-conductor electric cable.

THOR POWER TOOL COMPANY CHICAGO

Branches in all principal cities

... for more details circle 306, page 16

ROADS AND STREETS, April, 1957

TIRE SELECTION, CARE

(Continued from page 117)

mit it to fulfill its normal term of usefulness.

Repaired tires should be mounted in wheel positions which will, if possible, favor them with the easiest part of the work. One way is to mount the repaired section next to the vehicle. Here it is likely not to be subjected to as many hazards as the outer tire which operates at the edge of the hauling surface.

Retreading of grader and earthmover tires is being successfully done by many properly equipped shops throughout the country. One special requisite to secure satisfactory retreads is removal of the tire before the wear has gone too far.

When the tire has the non-skid entirely worn off, penetration of cuts into the breaker area is much more likely. Before satisfactory union of any tread rubber to the old tire body can be assured, every small cut evident when the old tread is removed must be cleaned out, filled with cement and rubber, and evened up with the surface to which the new tread is to be applied.

If operating conditions involve much rock haulage, a careful check should be made to determine whether recapping pays out. Running out the old tires on the original tread may give

- In repairing off-the-road and grader tubeless tires, punctures one-half inch or larger, large cuts, bruise-breaks, and so forth, require sectional or reinforced vulcanized repair. Use the same procedures for conventional tires in preparing sectional repairs, but be sure that repair patch is covered with a layer of cushion gum after application to tire to insure an air tight repair.

a lower cost, than if an investment is made in a retread which would give only a few hours of extra service.

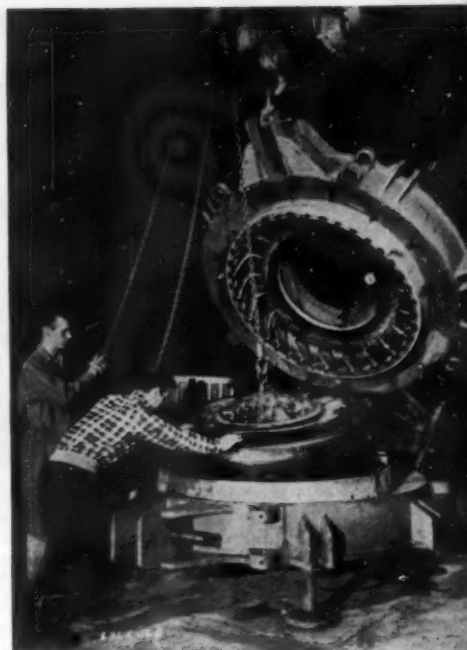
Storage of spares, and repaired or recapped tires not in use should be away from sunlight, oil and grease and under as cool conditions as possible.

Tires of vehicles laid up for any great length of time should either be kept well inflated, or the weight should be taken off them by jacking up the machines.

Protection of the spares and tires out of service is as important as proper operation of tires in use and in insurance on the investment of spare parts.

Whether new or repaired on the vehicles, or in spare stock, tires are a costly part of the contractor's stock-in-trade. Every bit of care given the tires will be rewarded by better performance and lower tire cost.

- Recapping procedures for off-the-road tubeless tires are the same as those used for conventional off-the-road tires.



Army Engineers Developing High-Speed Ditchers

Mobile ditching machines capable of digging four-foot deep trenches at rates exceeding 20 ft. per minute are undergoing tests at the Corps of Engineers' research and development laboratories, Fort Belvoir, Virginia.

Manufactured by the Owen-Pewthers Company (Texas) and the Barber-Greene Company (Illinois), the rubber-tired units may prove extremely useful to the army and the Civil Defense administration in providing emergency protection for personnel. And their speed is impressive to contractors.

The Barber-Greene model, mounted on a special vehicle which is powered by a 154-hp diesel engine, can dig the trench at the rate of 28 ft. a minute. It has 21 buckets with interchangeable insert-type teeth.

Mounted on a standard truck, the Owen-Pewthers unit is capable of digging at the rate of 24 ft. a minute. Its hydraulically operated boom can be placed into the digging position in less than a minute after arrival at a site.

The machine consists of 40 buckets which are equipped with interchangeable insert-type teeth, and features a side leveling mechanism that permits it to dig on side slopes up to 15 degrees.

Both units have a maximum digging depth of six feet.

"Deducts" From Road Dollar Shown in Missouri Report

The Twentieth Biennial Report of the Missouri Highway Commission includes, among a wealth of data required by law, a graphic picture of what happens to the highway revenue dollar in Missouri.

The whittling down of the money available for new road construction includes 3.3c per dollar going for administration, 3.9c for gas tax refunds, 4.4 percent other state departments, 1.8 percent bonds and interest, and 18.0 percent for highway maintenance—leaving 68.6c out of each dollar available for actual construction of new roads.

EDITOR WANTED

A responsible position open immediately for a civil engineer with journalistic leanings. Prefer man with practical experience in highway department, municipal work or contractor organization. Job involves some travel with camera. Give us your experience record and salary requirements in a brief letter if interested.

ROADS AND STREETS
Box 100-2





● Among the safety awards presented at the AGC convention. (Left): First-place award for best 5-year record for highway contractors being given to Art Rooks, of A & A Asphalt Paving Co., Birmingham, Mich., by AGC's retiring president, Frank J. Rooney. (Right): Highway division awards received by Allan McKay for S. J. Groves & Sons Co., Illinois Div., Springfield, Ill.; Percy F. Loiselle, Triangle Construction Co., Kankakee, for AGC of Illinois; and S. J. Matz, Seneca Petroleum Co., Inc., Chicago.

AGC Contractors Set Job Safety Record

When representatives of 6,800 contracting companies gathered in Washington, D. C., last month for the annual AGC convention, one of the many industry problems they took up was that of job accident prevention and its many economic and humane aspects. The nation-wide drive by the Associated General Contractors to enlist members in safety programs is paying off in a continued lowering of the accident rate, saving in human suffering and reduction in job costs.

THE safest job handling in its members' history is reported for 1956 by The Associated General Contractors of America.

Chief reason given for this outstanding safety record is the increasing interest AGC members have been showing in making their jobs safer places to work. In 1955, there were 2,676 firms participating in the association's safety program. Last year 3,260 companies, or nearly one out of two, took part.

The end result of this increased interest in accident prevention has been a general decline in the number and severity of accidents. In 1955, AGC firms reported an average of 35.6 accidents and 2,851.6 days lost per million man-hours worked. Last year these figures dropped respectively to 29.6 and 2,826.2, indicating that the mishaps

which did occur were not as frequent or severe.

The AGC's downward trend is in contrast with government figures for all types of construction, which were up from 32.1 in 1954, to 34.5 in 1955, or by 8 percent.

Indicative of the steady growth in safety work were the 16 AGC chapters which had 100 percent of their members sending in monthly safety reports. There were 10 such chapters in 1955.

Last year's chapters with 100 percent participation by their members are: Michigan Road Builders Association, the AGC of Missouri, the Detroit Chapter, the Kansas City Chapter, the Constructors Association of Western Pennsylvania, the Seattle Chapter, the AGC of West Virginia, the Ohio Highway Chapter, the Louisville Chapter, the

Michigan Chapter, the Nebraska Building Chapter, the Dallas Chapter, the Austin Chapter, Master Builders Association of District of Columbia, the Tacoma Chapter and the Memphis Chapter.

AGC safety director Harry J. Kirk, whose office conducts this program, said that 1956 was the year of greatest safety activity by members. "Our goal is to get every chapter member to send in complete forms for each month of the year," said Kirk. "The important fact to remember when we improve our records, is that the construction workers gain the most from this program, with the public and the construction industry receiving the secondary benefit of lower construction costs.

"For every accident that is prevented, there is that much less hu-

man suffering," he said.

To assure that firm names will be held confidential when the details of the survey are published in full next month, individual firm records are held confidential. However, detailed summary tables are made available to cooperators in the various work classifications along with a copy of his own record. Thus a particular firm can compare its own record with others in its particular group.

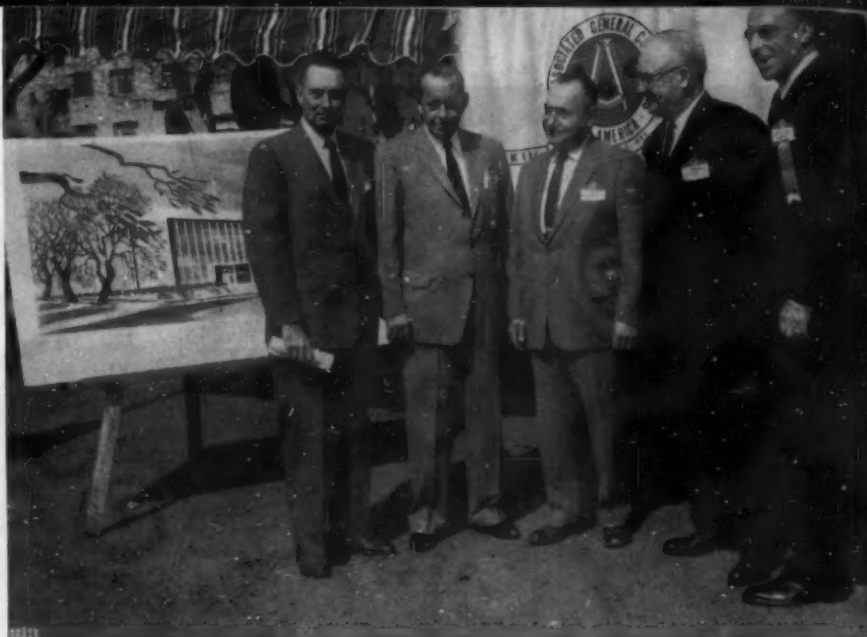
A total of 68 first, second and third place awards to member firms and AGC chapters were presented at the 38th AGC convention in Washington, D. C., March 11-14. First place awards, totaling 32, were evenly divided among the "100%" chapters and top-rated companies. These included (Building division omitted):

- **Highway Division.** Burrell Construction and Supply Co., New Kensington, Pa., with over 200,000 man-hours; Ira Van Buskirk and Sons, Hawarden, Iowa, with less than 200,000 man-hours.

- **Heavy Division.** Ferguson and Edmondson Co., Pittsburgh, with over half a million man-hours; and the Marion Coal and Supply Co., Pittsburgh, with less than half a million man-hours.

- **Five-Year Record.** Among building firms—Robert E. Nesmith, Inc., Houston, with over one million man-hours; W. A. Abbitt Co., Inc., Charleston, W. Va., with less than one million man-hours. Among highway firms—A & A Asphalt Paving Co., Birmingham, Mich. And among heavy engineering firms—Nick Istock, Aliquippa, Pa.

- **Ten-Year Record.** Martin L. Bauer Construction Co., Middle-



• At ground breaking ceremonies for AGC's new headquarters building at Washington, D. C.: F. W. Heldenfels, Jr., Heldenfels Bros., Corpus Christi, Texas, vice president elect of AGC; Joseph F. Nebel, of Washington, contractor for the building; and Lester C. Rogers, of Bates & Rogers Construction Corp., Chicago, AGC's 1957 president.

town, Ohio, for building firms; George K. Werner & Son, Clay Center, Nebr., for highway firms; and a first place tie between George Carlson Co., Milwaukee, and the Maxon Construction Co., Dayton, Ohio, for heavy engineering firms.

- **2nd and 3rd Place Winners** (Building firms omitted): Heavy Division—S. J. Groves and Sons Co., Minneapolis, second place, and the Cadillac Asphalt Paving Co., Detroit, third place, with over 200,000 man-hours. The Seneca Petroleum Co., Inc., Chicago, second place,

and Charles J. Rogers, Inc., Detroit, third place, among firms with less than 200,000 man-hours.

Heavy Division—Oahe Constructors, Pierre, S. Dak., second place, and Montag-Halvorson-Cascade-Austin, The Dalles, Oregon, third place, with over 500,000 man-hours. Nick Istock, Aliquippa, Pa., second place, and Eaton and Smith, San Francisco, third place, with less than 500,000 man-hours.

Five-Year Record — (Highway)

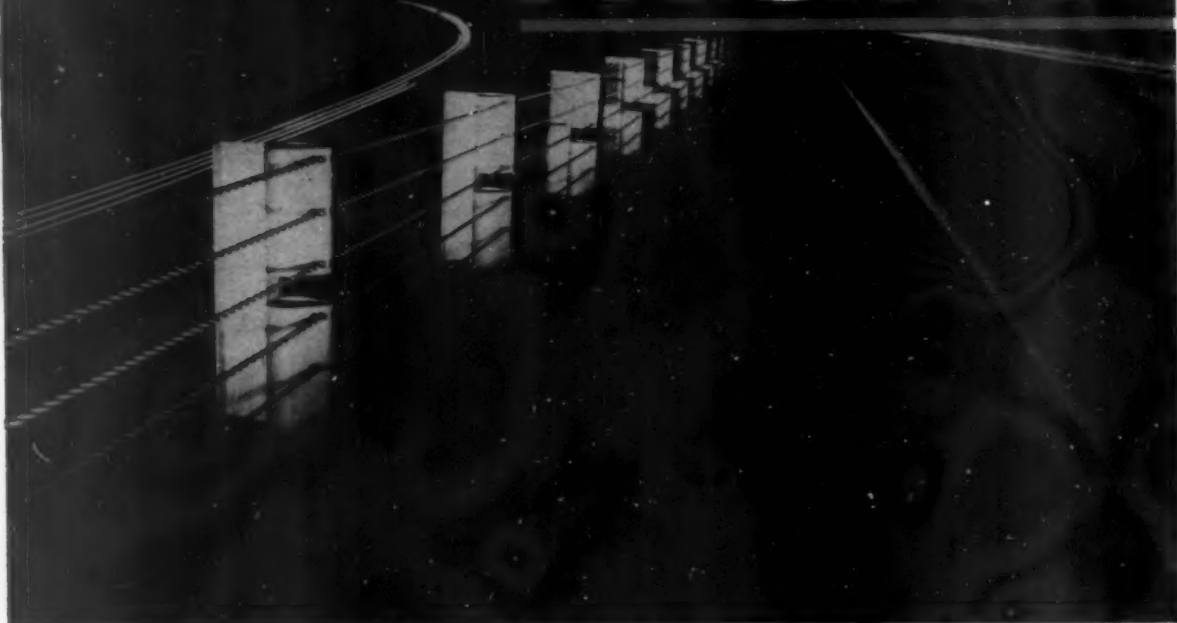
(Continued on page 175)

- At highway session, AGC convention: J. M. Sprouse, manager of the Association's highway division (speaking); Edward O. Earl, San Xavier Rock & Sand Co., Arizona, retiring division chairman; B. D. Tallamy, Federal Highway Administrator; and John A. Volpe, of Volpe Construction Co. (recent interim highway administrator).

- New AGC highway division officers: Manley Osgood, Ann Arbor Construction Co., Ann Arbor, Mich., vice-chairman; E. O. Earl, retiring chairman; W. Ray Rogers, Rogers Construction Co., Portland, Ore., 1957 chairman; J. M. Sprouse, division manager, Washington, D. C.



SAFETY NIGHT.



ALONG THE ROAD. Day and night, Multisafety Cable Guard stands guardian of America's newest highways, giving two-fold protection from serious accidents. It restrains vehicles from plummeting off the berm. In addition, its resilient combination of strong, steel cables and spring-steel offset brackets cushions the shock of any collision . . . helps prevent damage to the vehicle and injury to passengers.

ECONOMY IN CULVERTS.

American Welded Wire Fabric brings the same service-lengthening benefits to culverts as to pavements. Concrete, reinforced with Welded Wire Fabric, is the economical way to build culverts because this combination of materials resists abrasion, has the strength to withstand high stresses, and is easily installed.



SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

USS Multisafety Highway Guard



and DAY



They engineered these roads for *safe*, high-speed driving. They straightened curves. They used big, wide median strips. They put the traffic lanes on different levels where possible. Then, they used construction materials manufactured by American Steel & Wire to enhance the basic safety designed into the road.

Materials such as Multisafety Highway Cable Guard which protects the sides of the road. American Welded Wire Fabric which lengthens the life of the pavement . . . keeps it smooth, easy-riding, and safe. And American Road Joints which smooth the transition from slab to slab.

These are essential materials for any truly modern highway. Use them in your roads . . . in your city streets.

AMERICAN STEEL & WIRE DIVISION
UNITED STATES STEEL
GENERAL OFFICES: CLEVELAND, OHIO
 COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
 PACIFIC COAST DISTRIBUTORS
 TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.,
 SOUTHERN DISTRIBUTORS
 UNITED STATES STEEL EXPORT COMPANY, NEW YORK

IN THE PAVEMENT. A smooth pavement is a *safer* pavement, and American Welded Wire Fabric and American Road Joints help assure years of smooth, safe riding on great highways such as the Ohio Turnpike, the Pennsylvania Turnpike, the Indiana Toll Road, and others.

American Steel & Wire
 Room SF-45, Rockefeller Bldg.
 Cleveland 13, Ohio

Please send complete information on the following products:

- | | |
|---|--|
| <input type="checkbox"/> American Welded Wire Fabric for Portland Cement Concrete | <input type="checkbox"/> American Road Joints |
| <input type="checkbox"/> American Welded Wire Fabric for Asphaltic Concrete | <input type="checkbox"/> Multisafety Highway Cable Guard |
| <input type="checkbox"/> American Welded Wire Fabric for Airport Runways | <input type="checkbox"/> American Beam-type Highway Guard |
| | <input type="checkbox"/> American Wire and Strand for Prestressed Concrete |
| | <input type="checkbox"/> Road Manual |

Name
 Firm
 Address
 City State

USS American Welded Wire Fabric

UNITED STATES STEEL

... for more details circle 204, page 16

ROADS AND STREETS, April, 1957

Kentucky Turnpike Features Aluminum

in lighting standards, bridge railings, sign blanks and in extruded panels for

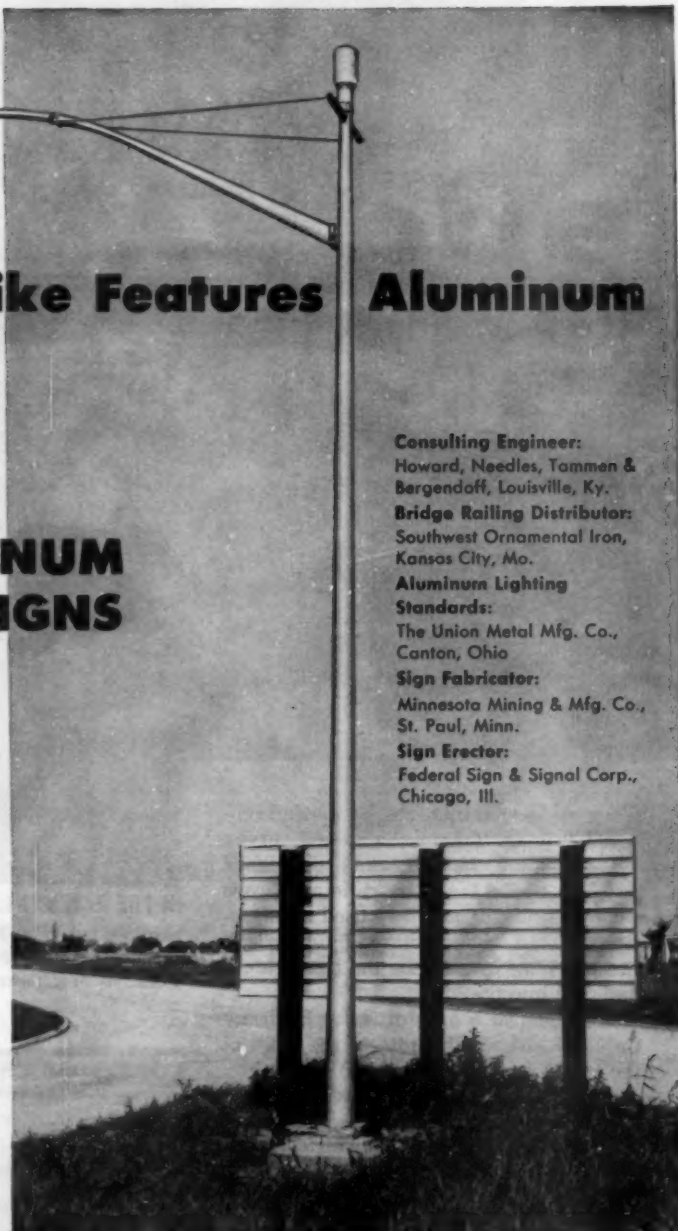
REYNOLDS ALUMINUM SUPERHIGHWAY SIGNS

New road networks mean more uses of aluminum...because this light, strong, rustproof, corrosion-resistant metal is modern and attractive, eliminates painting, minimizes maintenance, cuts handling and installation costs.

Important recent development is the Superhighway Sign made up of Extruded Aluminum Panels with Interlocking Joint Designs. This construction speeds erection and accident repair, provides exceptional strength and rigidity, and eliminates usual back bracing of large signs.

Reynolds also supplies standard Sign Blanks. Write for literature—especially for the brochure "Reynolds Aluminum Superhighway Signs".

Reynolds Metals Company,
General Sales Office, Louisville 1, Ky.



Consulting Engineer:

Howard, Needles, Tammen & Bergendoff, Louisville, Ky.

Bridge Railing Distributor:

Southwest Ornamental Iron, Kansas City, Mo.

Aluminum Lighting

Standards:

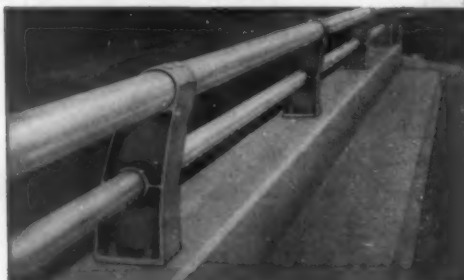
The Union Metal Mfg. Co., Canton, Ohio

Sign Fabricator:

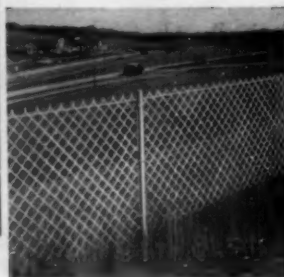
Minnesota Mining & Mfg. Co., St. Paul, Minn.

Sign Erector:

Federal Sign & Signal Corp., Chicago, Ill.



Aluminum Bridge Railings will not rust, never need painting. Write for Reynolds 52-page book.



Aluminum Chain Link Fencing stays strong and beautiful, resists rust without maintenance.

The Finest Products
Made with Aluminum

are made with

REYNOLDS  ALUMINUM

REYNOLDS ALUMINUM

Bucket teeth and ripper available at extra cost.



TEETH AT BOTH ENDS* BOOST PROFIT!

Production really steps up when this working team moves in—the Allis-Chalmers HD-6G tractor shovel with replaceable bucket teeth and rear-mounted ripper. Here's a job-proved combination engineered by the company that pioneered modern tractor shovels for the construction industry.

When the hydraulically controlled ripper bites in, even hard blacktop has to give. With the help of teeth at the front end, too, tough material is loosened and broken up for fast, easy loading—a full bucket every time.

You get more work done in less time because the heavy-duty HD-6G is designed for tough jobs. With 72 net engine hp and six-truck-wheel stability, it offers performance that means efficient production, bigger profits for every hour on the job.

These important advantages are also available on bigger Allis-Chalmers tractor shovels—the 2½-yd HD-11G, the 3-yd HD-16G, and the 4-yd HD-21G ... to help you meet the needs of your tractor shovel jobs profitably. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

... for more details circle 198, page 16

ROADS AND STREETS, April, 1957

Engineering in Action

Novel Steel Forms for "T" Piers

Basic new idea in forming assured economy of multiple use, eliminated shoring and facilitated architectural rustication.

TWO SPECIAL forming requirements established for the foundations for the James River bridge, now under construction at Richmond, Virginia, on the Richmond-Petersburg turnpike, resulted in development of one basically new idea in steel column forming and the designing of a new system for holding steel forms in place during a pour.

The James River bridge will carry six lanes of traffic when completed. It consists of two independently supported, parallel, 40-ft. wide roadways. Over-all width of the structure is 90 ft., with the extra 10 ft. being used for the 4-ft. median strip and 3-ft. sidewalks on each side. Length of the bridge is 4,182 ft. made up of varying span lengths. Striking appearance of the design

is due to the method employed to independently support each of the parallel roadways. The substructure of the bridge is made up of single 7-ft. 9-in. diameter columns topped with massive 44-ft. wide "T" heads. The two 40-ft. wide roadways will be supported by 100 of these columns.

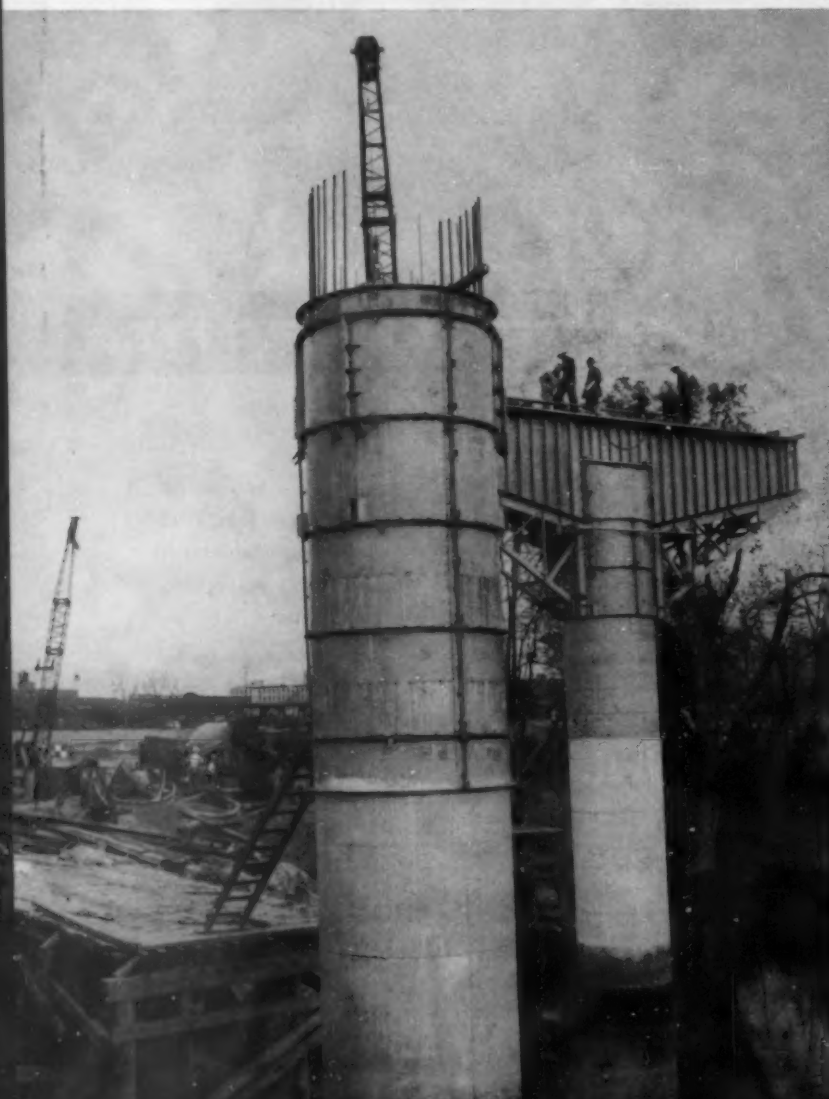
One of the requirements was imposed by the engineer, D. B. Steinman, Consulting Engineer of New York City, who also designed the Mackinac Straits bridge in Michigan. Another requirement was specified by the contractors, Bowers Construction Company, who is doing the south half of the bridge, and T. A. Loving and Company, doing the north half.

One of the built-in problems in forming imposed by the designers is connected with the rustication grooves on each pier. The grooves are placed in the concrete at 8-ft. intervals, from the top down. With varying column heights, it was necessary to make an adjustable, circular, telescoping form for the initial pillar pour atop the foundation.

The height of this new circular form designed by Blaw-Knox can be adjusted for any elevation from fractions of inches to multiples of a foot. In this way, regardless of the elevation of the footing, the contractors are able to have all rustication grooves above water in line with grooves on all other piers.

A requirement established by the contractor was that the circular forms had to be so constructed that

- Both T-head and column forms are supported on and by the work rather than being externally guyed. To make the vertical lifts, a 2-ft. lap ring (see pier nearest camera) is left in place after a pour. Securely held by the concrete it retains, forms below are stripped and added atop the lap ring, which in turn, supports 4-ft. circular sections for the new pour. T-head forms are supported by 4-ft. pier rings equipped with special hangers (see forms at top of first pier).



they required no guying. This was accomplished through use of a 2-ft. lap ring. Setting up for pour, the contractor installs as many circular 4-ft. sections as required and tops these with a 2-ft. lap ring. The pour, usually made in 16-ft. lifts, is to the top of the lap ring.

After the concrete sets, all rings below the lap ring are removed and reset on top. The lap ring is left in place, securely held by the two feet of concrete inside it, and supporting the vertical pressure added above.

No guying is needed for the hammerheads. Several sets of special pier rings are fitted with hangers to support the base and bulkheads of the "T".

Each contractor has enough steel forms to pour 6 columns. Due to the differential in stripping time, each contractor has approximately twice as many base forms for the hammerheads as sidewall forms.

The James River bridge is under construction by the Richmond-Petersburg turnpike authority, for whom the firm of Parsons, Brinckerhoff, Hall & Macdonald, Engineers, of New York City, is the general consultant.

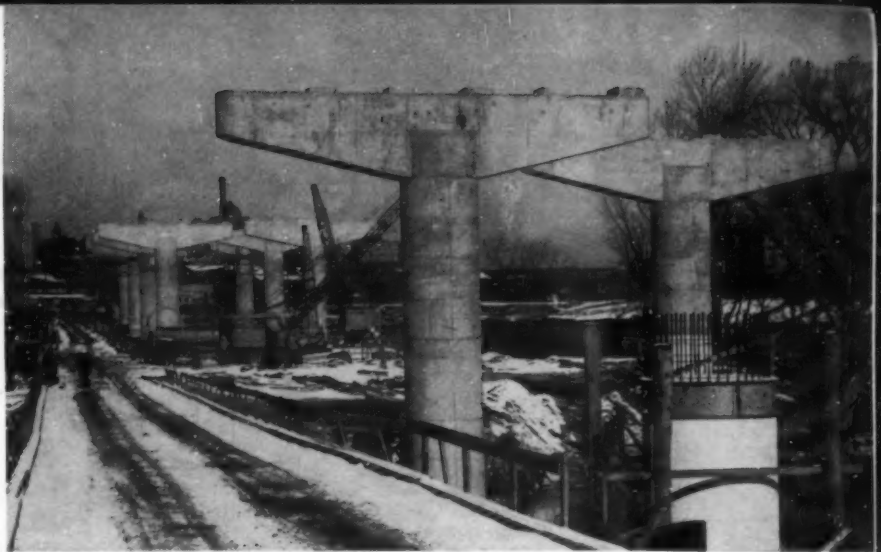
Urban Research Committee to Tackle Highway Problems

Considered as one of the most important moves in recent years by the Highway Research Board, a new Committee on Urban Research has been formed to promote fact finding in urban problems, particularly as they relate to all forms of transportation.

Because of the complexity of the problems, the Committee was conceived as an "interdisciplinary" group. Thus the fields of city planning, highway engineering, city management, geography, and economics are represented on the Committee. The Automotive Safety Foundation has provided funds to initiate this endeavor.

Chairman of the new Committee is E. Willard Dennis, Board Chairman of Sibley, Lindsay and Curr Company, Rochester, N.Y. Seventeen members make up the group.

● About 200 of the 500 town bridges existing on the New York State Highway System will be taken over during 1957 by the state and many of them scheduled for reconstruction. It is planned to absorb the entire 500 bridges within three years.



● An example of economic single-pillar pier design which lent itself to form standardization.

Old Aluminum Hand Rail Reused on Laredo Bridge

The new International bridge recently completed across the Rio Grande at Laredo, Texas, following the destructive flood of 1954, is new throughout with one exception. That exception is the bridge's aluminum railing.

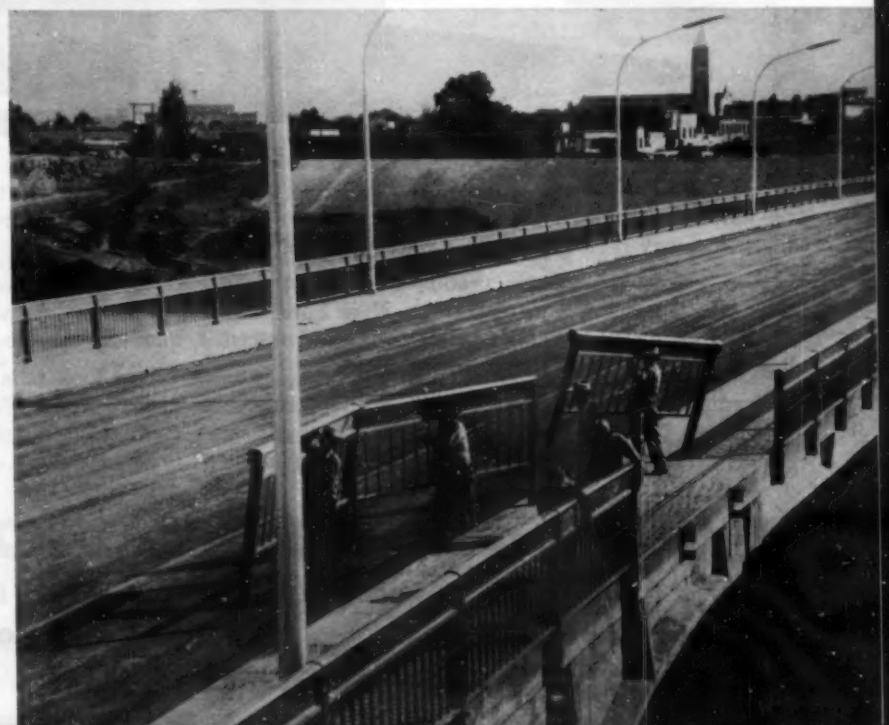
This railing consists of the rail salvaged from the old bridge. Despite its 22 years of service, this railing proved to be reusable and, in fact, has retained its original luster and full strength, according to the engineers. It represented a pioneer installation of its kind in

1934 when the Aluminum Company of America sold the idea of this type of railing to the bridge authorities.

The railing was originally designed for quick removability in the event of impending destruction of the bridge by flood. The railing was again installed with the removable feature since there is a flood possibility until the new Diablo dam upstream is completed.

In addition to the old railing, the new bridge includes something entirely new, 20 aluminum davit-type design light standards made of Alcoa aluminum by Union Metal Company.

● Reinforcing quarter century-old aluminum railing panels, taken from the old flood-destroyed bridge, as part of the new International bridge at Laredo, Texas.



New '57 Ford

Modern through and through

...to cost you less!

New Tilt Cab line offers six series from 18,000-lb. GVW to 60,000-lb. GCW. Up to 212 horsepower.



Modern with a purpose—that's the Ford truck story for '57. Modern through and through to give you high-efficiency performance that costs you less!

And, thanks to volume production, Ford trucks cost you less right from the start. New Ford Tilt Cabs—in addition to being America's most advanced line of Tilt Cabs—are the lowest-priced!*

Ford's tandem axle models are built from the ground up for extra-heavy-duty work. These husky trucks are rated to carry as much as 6,000 pounds

more payload than other leading tandems with comparable specifications.

For durability, there's new toughness everywhere—in stronger frames, in sturdier axles, in higher-capacity springs . . . more reasons why *Ford trucks last longer than any other leading make.*

One look tells you—here's something new, really new, in trucks. For the *full* story on what they can do, contact your Ford Dealer today!

*Based on a comparison of factory-suggested list prices.

FORD TRUCKS COST LESS

... LESS TO OWN ... LESS TO RUN ... LAST LONGER, TOO!



ONLY FORD GIVES YOU ALL THESE MODERN FEATURES

NEW Heavy Duty V-8 engines now have 4-barrel carburetion standard. Fresh-air intake with new thermostatic control optional on 302 and 332 V-8 engines. Dual exhausts also available.

NEW Styloside pickup bodies, standard at no extra cost. America's biggest pickup bodies! Built wider with all-steel rugged box section corner reinforcements and recessed taillights.

NEW riding comfort! A completely new chassis suspension, roomy cabs with increased visibility, greatly improved riding and handling ease.

NEW power advances! New higher horsepower, new freer breathing, new higher compression ratios, new Super-Filter air cleaner. New advancements from camshafts to carburetors.

NEW Driverized cabs—completely new—stronger, roomier, smarter! New wider full-wrap windshield. New inboard cab step, new Hi-Dri ventilation, new easy-to-read instrument panel!

NEW chassis strength! New frames, up to 13% stronger. New sturdier axles! New higher-capacity, easier-riding springs!

**MAIL THIS
COUPON TODAY!**

FORD Division of FORD MOTOR COMPANY, P. O. Box 658, Dearborn, Michigan

Please send me the following truck model literature:

- | | | |
|---------------------------------------|--------------------------------------|-------------------------------------|
| <input type="checkbox"/> CONVENTIONAL | <input type="checkbox"/> TILT CAB | <input type="checkbox"/> TANDEM |
| <input type="checkbox"/> LIGHT DUTY | <input type="checkbox"/> MEDIUM DUTY | <input type="checkbox"/> HEAVY DUTY |

Name _____

Address _____

City _____

State _____

IL

Vibrate your way to higher profits with... Maginniss Hi-Lectric Concrete Vibrators

STRUCTURES



MAGINNISS' CONCRETE VIBRATORS speed up pours, cut labor costs, produce blemish-free concrete. Two 180 cycle, 120 volt models; HCV-3 for bridge, pavement and building work; HCV-6 for massive structures. Powered by choice of nine different gasoline or electric driven generators. (Uni-lectric 110 volt universal motor vibrators for smaller jobs, too.)

FULL SLABS



MAGINNISS INTERNAL FULL SLAB VIBRATOR ATTACHMENT provides uniform vibration of entire slab, boosts production, reduces finishing to one pass. 180 cycle induction motor-in-head vibrators, fully adjustable for any spacing, and for depths of 4 to 19 in. Powered by compact, lightweight engine-generator. Fits all makes of paving machines.

SIDE FORMS



MAGINNISS SIDE FORM VIBRATOR ATTACHMENT fits all makes of paving machines. Prevents honeycomb, eliminates hand labor, speeds production. 180 cycle induction motor-in-head vibrators, fully adjustable for depth and spacing, choice of instant manual or hydraulic retraction. Generator also powers floodlights and service tools.

PAVEMENT WIDENING

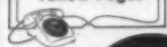


MAGINNISS PAVEMENT WIDENING VIBRATOR ATTACHMENT fits any widener, eliminates need for accessory vibrating screed or for hand finishing. 180 cycle induction motor-in-head vibrators in hopper plasticize stiffest concrete . . . permit production rates up to 25 fpm on slip-form paving. Generator also powers service tools, floodlights.

See us at CONEX,
Booth 215

In 85 principal cities

Find your nearest
distributor in the
'Yellow Pages'



Maginniss
HI-LECTRIC
POWER TOOLS

On jobs where profit-conscious contractors are at work, you'll find Maginniss Hi-lectric vibrators in action!

That's because powerful Hi-lectric vibrators with induction motor-in-head design, produce up to 10,500 VPM . . . cut placing time . . . produce sounder, better looking concrete at lower cost.

Whether you're pouring footers, building structures, paving highways or airports, it'll pay you to investigate—and use—the profit-boosting features of Maginniss Hi-lectrics. You'll find that Hi-lectric vibrators offer true one-man operation . . . that they have no cumbersome, hard-to-maintain flexible shafts . . . that they provide plenty of power to handle stiffest concrete mixes with ease.

Whatever your concrete vibrating needs may be, your nearby Maginniss distributor can recommend . . . and supply . . . Hi-lectric vibrators and generators exactly suited to your requirements. Get all the facts today!

AA-4822

MAGINNISS

Power Tool Company
154 Dist Avenue, Mansfield, Ohio

For all your concrete vibrating needs . . .



. . . for more details circle 272, page 16

ROADS AND STREETS, April, 1957

GREENVILLE ATECO LOADER

and attachments for JOHN DEERE 420 CRAWLER

Here's America's biggest selling loader—designed specially for John Deere tractors. Proved on the job by thousands of owners. Unit has big reach . . . bucket clears 9' 5"—has 2' 6" reach in dump position and levels automatically as it raises. Bucket hinge pin adjusts for hydraulic tilt-back for fast loading with minimum spillage. Extra-heavy, lubricated pins and bushings at all hinge points are replaceable. See it at your John Deere dealer's now.



SCARIFIER

Speeds loading; saves wear and tear on tractor and loader; accommodates five shanks equipped with inexpensive, replaceable points.



FORK LIFT

Mounts easily in place of bucket. 66" bulldozer blade and crane hook attachments available.



STANDARD BUCKET

Handles up to 3/4 cu. yd.; accommodates 4 teeth; large bucket for light materials handles up to 1 cu. yd.



GREENVILLE

STEEL CAR COMPANY

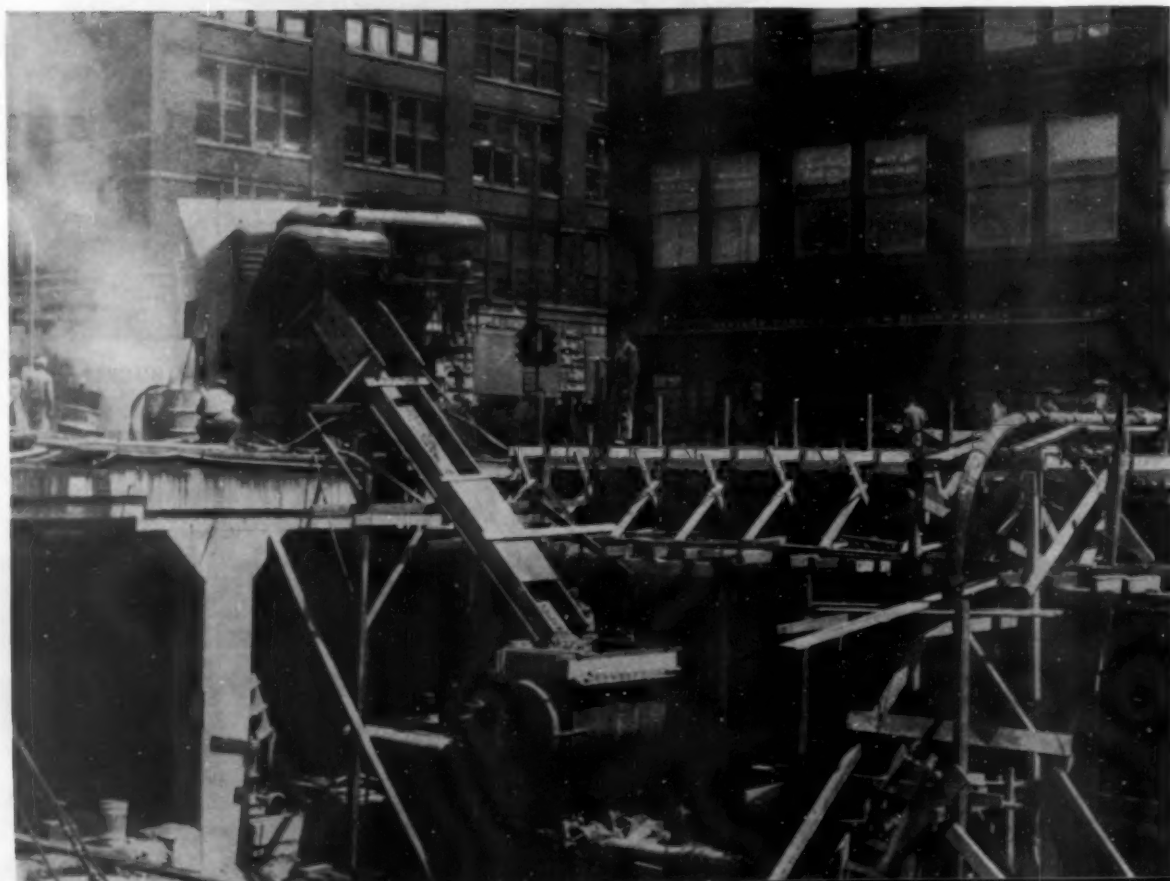
ATECO DIVISION
Greenville, Pennsylvania

. . . for more details circle 243, page 16



● Metal forms for columns, the use of which saved thousands of dollars in forming costs. They paid for themselves in the first block's work.

● Rex paver chuting batch into Pumcrete line extending up through bend at street level to pouring site.



On Wacker Drive Viaduct in Chicago

Form Costs Halved by Special Design

How a bridge contractor can employ good form design and pumped concrete to cut costs was demonstrated in decking the upper level of the Wacker Drive extension in Chicago.

The double-deck roadway for Wacker Drive is part of Chicago's expressway facilities edging on the central business district. Herlihy Mid-Continent Co., which recently built one contract section, reused metal column forms over 30 times, and set up a Rex 34E paver and Pumpcrete unit which could distribute concrete to areas as far away as 500 ft.

The Wacker Drive job is an example of the complexities and high costs involved in such a metropolitan project. Running north and south on the western edge of the Loop, the two-level roadway is hemmed in on both the east and west, in many cases by a row of multi-story buildings. To keep the heavy traffic of the east and west streets open, the decking has been done a block at a time—one block each year—over the 7-block stretch. The job started at Lake Street in 1949, and has proceeded southward.

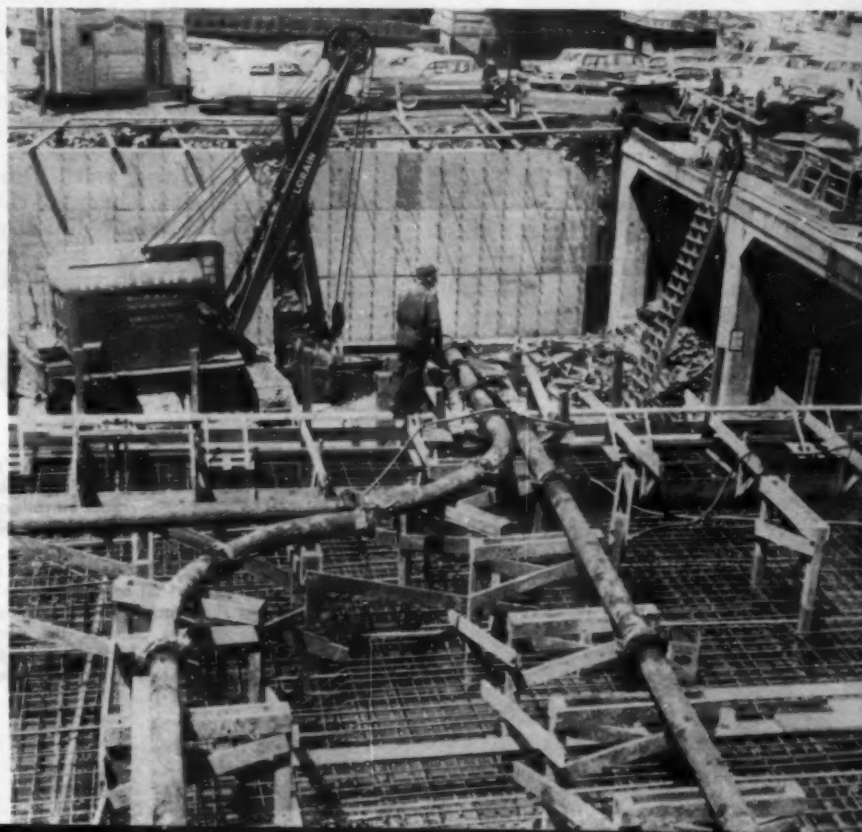
A block that could be cited as typical, although each block brought its own foundation problems, was that between Jackson and Van Buren Streets, which was completed during the 1956 season. Completion of this block makes the final connection between Wacker Drive and the Congress Street superhighway. This block, contain-

ing two 36-ft. roadways on its deck, is 392 ft. long. The procedure here, as well as in all previous blocks, was to excavate from the level of the old street through rubble and clay to a depth of about 15 ft. A Lorain 820 shovel with a 2-yd. dipper carried the burden here. At times, when some heavy old foundation concrete slabs were encountered, crews had to wield jackhammers to break up the material.

An old elevated railway viaduct also had to be removed and its floating foundations chopped out.

● **Piers to Hardpan.** The Wacker Drive structure is carried upon sub-piers 4 ft. in diameter. These concrete caissons were extended down to hardpan, about minus 55. Seventy-seven columns, spaced 30 ft. c-c in one direction and 28 ft. c-c in the other, were set either on top of sub-piers or, in areas along the building line, on foundation girders cantilevered over caissons. To avoid disturbing the soil at an existing tunnel under the roadway

(Continued on page 138)



● **Pouring areas as far as 500 ft.** were reached with these Pumpcrete lines. After pouring an area, a 10 ft. section was uncoupled from the line to pour the next area.

On any-size dirt job, anywhere... power-up profitably with



In the 200-acre Knollton Heights Subdivision, Hughy Construction Company, Indianapolis, stays ahead of the lot-grading with this TD-9 Four-In-One. Here, they're getting inch-close grading accuracy—boiling in dirt with Four-In-One "carry-type scraper" action! Excavating, loading, dozing, or clamshell action is instantly available with a Four-In-One!



"Our bread-and-butter machines are International Crawlers," says Perry Alexander, Jr., for Perry Alexander Construction Co., Asheville, N. C. "I just traded in a TD-18A, with 13,000 hours on its meter; used no oil between changes—and beat a competitive crawler in overall maintenance and track life." Picture shows their new TD-14 finish-grading around Asheville's new \$600,000 Doctor's Building.



See how the bonus-powered International TD-18, for example, helps speed construction of "decentralized" new factories. You get cleared-for-action deck, control-tower visibility and booster steering to cut lever-pull effort. You also get operating ease of engine clutch with long-lasting Cerametallic facings. Such exclusive *feature combinations* help operators increase daily production, substantially!

For your king-sized jobs, check these *giant-sized* advantages of the *giant-powered* TD-24. See how exclusive, time-proved Planet Power steering gives you full-time "live" power and traction on both tracks for positive, full-load steering, upgrade or down! Plus cycle-speeding on-the-go shifting—and instant, stall-preventing Hi-Lo shifting, without declutching!

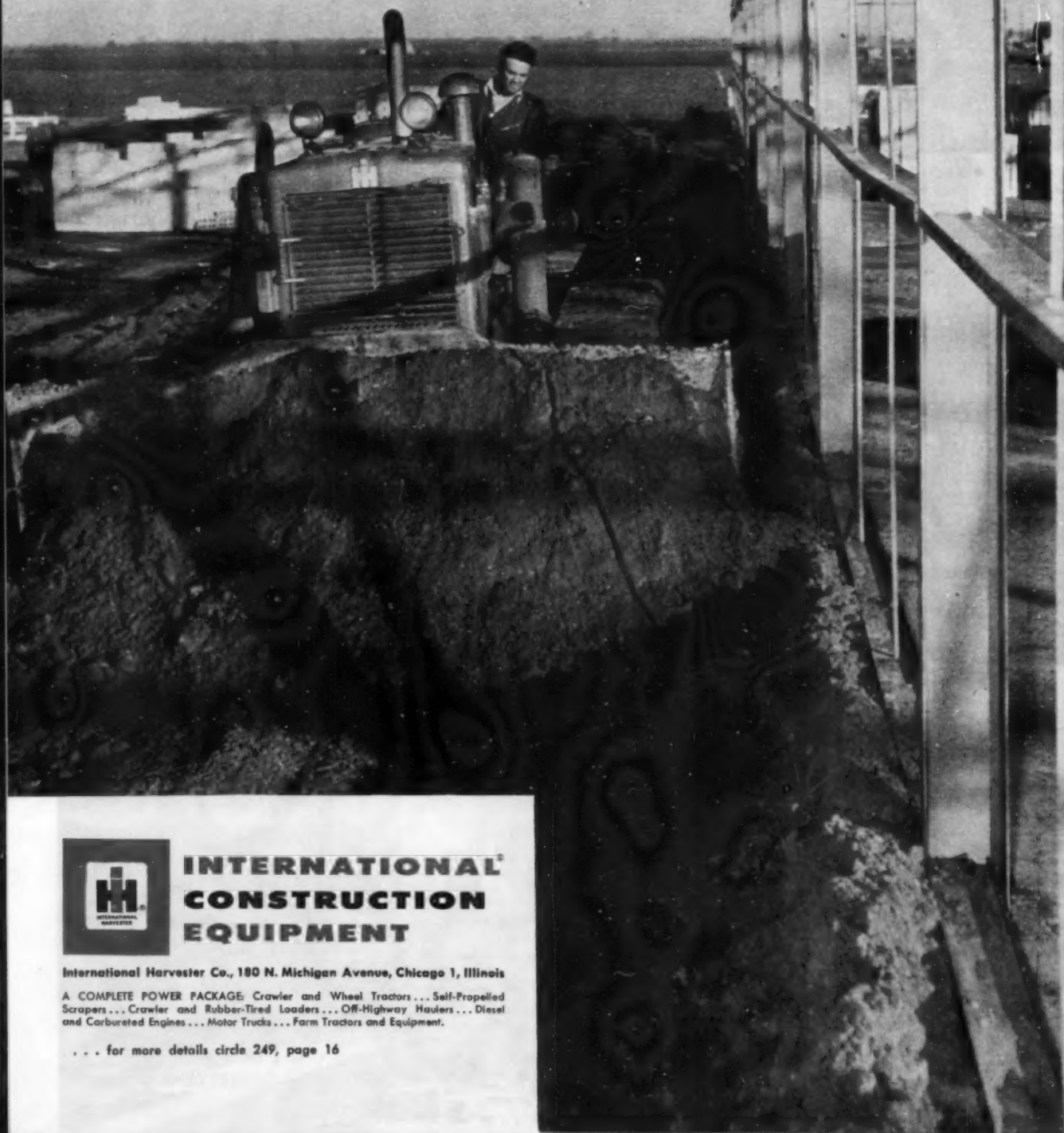
For dirt-moving versatility, International Drott® Four-In-One Skid-Shovels® give you huge performance and production advantages over anything else in the loader-excavator field! You get instant, fingertip availability of *four* big-capacity machine actions: famous Skid-Shovel dig-ability; scraper-like grade-or-spread ability; earth-rolling bulldozer; and load-gulping, high-dumping clamshell!

Along with the superhighways are other millions of cubic yards of "big-pay dirt" to be moved in plant, school, public building, shopping center, and housing developments. *Prove to yourself* the reasons why more and more contractors are using International crawlers as their *power packages*. See your International construction equipment distributor for a demonstration.

◀ "One of our TD-24's—a 1951 model—ran 7,500 hours before major overhaul on rails and engine," states P. H. Morris, for Morris Enterprises, Owensboro, Ky. "It's still in use with original rollers and sprockets. That sold me on TD-24's for my operation." This Morris-owned TD-24 moves 50% of the 45-foot earth-shale-soapstone overburden, ahead of the 3½-yard dragline.

Industry comes to Marked Tree, Arkansas—(population 3,000)—as a modern shirt factory rises on money locally-subscribed to create jobs. And local contractor, St. Francis Valley Construction Co., gets a profitable 8,000-yd fill-spreading job done on time with their hydraulic 'dozer-equipped TD-18!

.....contractors International!



INTERNATIONAL[®] CONSTRUCTION EQUIPMENT

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

... for more details circle 249, page 16



● Koehring crane moving material near caissons. These subpiers are near bridge pit. They extended to rock.



● International TD24 stockpiling excavated material from caissons for hauling.

● View of Jackson-Van Buren block of Wacker Drive looking north. This is the last block of the improvement.



FORM COSTS HALVED

(Continued from page 135)

and also at the pit foundations of the adjacent Van Buren St. Bridge, seven of the caissons were sunk to rock. Ingersoll-Rand clay spades mucked out the clay in the caisson wells.

Closure walls, 16 ft. high, were poured along the westerly side of the structure, the walls being 15 in. thick and formed by Universal panels. The walls were designed to retain the earth-filled parking lot areas along the west side of the work, since the grade of the lower level of Wacker Drive is generally about 10 ft. below the grade of these lots.

● **Column Forms.** The deck columns are 4 ft. in diameter in the stem with a capital to take the shear loads, over-all height of 15 ft. Taking note at the start of the job of the higher costs in manpower of dismantling wooden forms and the disintegration of this material during stripping, the Bureau of Engineering designed a mold for the columns made of $\frac{3}{16}$ -in. plate by the Universal Form Clamp Company.

Made up in eight sections and bolted together on the ground, the forms were raised to upright position by a Koehring crane. They were set on the caissons or foundation girders and their interiors swabbed with paraffine oil.

A tar coating was applied atop each caisson or foundation girder to prevent bond and a $\frac{1}{2}$ -in. thick lead plate placed on the tar; this permitted a rocking motion of the rigid superstructure to absorb temperature changes and other forces. It is estimated that the use of the metal forms have reduced column form costs by 50 percent.

(Continued on page 140)

"The T-700 does more than twice as much work as any other machine we have used"



That's the opinion of George M. Pyle, a Mine Superintendent at Hanna Coal Company strip mines in Ohio.

According to Mr. Pyle, before they acquired the Galion T-700 GRADE-O-MATIC Motor Grader, three competitive heavy duty motor graders were being used seven grader shifts per day. Now they use only the Galion T-700 for three shifts—and with much better results. The savings are estimated to be at least \$100.00 per day. Furthermore, the operators appreciate the ease of handling and performance of the Galion T-700 as compared to the graders previously used. The other motor graders are no longer being used for this extremely heavy work.

Grader service in strip mining is plenty rough—rougher than usually encountered on construction work. What Galion GRADE-O-MATIC Graders do in strip mines, they'll do—with added emphasis—for you on your big highway construction jobs. Write for literature.



GALION Graders with GRADE-O-MATIC DRIVE

Engineered balance of power and weight gives you most "PUSH-POWER" at the blade for moving more material in quicker cycles.

GRADE-O-MATIC Drive provides automatic torque multiplication as needed, absorbs load shocks, prevents engine lugging and stalling. Power-shift transmission—no foot clutch—means less operator fatigue. Engine speed automatically adjusts to meet all loads or conditions at any predetermined working or travel speed.

Three GRADE-O-MATIC Sizes

Model T-700, 190 h.p., 40,125 lbs.
Model T-600, 140 h.p., 30,420 lbs.
Model T-500, 125 h.p., 25,765 lbs.

MOTOR GRADERS · ROLLERS



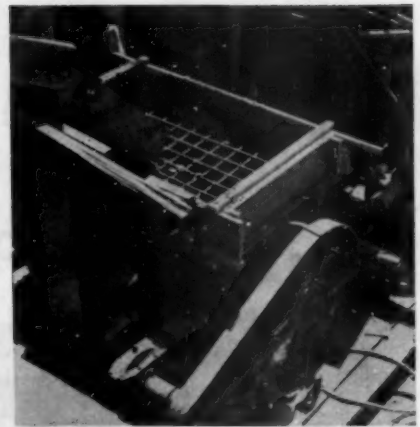
THE GALION IRON WORKS & MFG. CO., General and Export Offices, Galion, Ohio, U.S.A.
Cable address: GALIONIRON, Galion, Ohio

... for more details circle 235, page 16

ROADS AND STREETS, April, 1957



● Diamond T truck delivering dry batch to Rex 34E paver.



● Top view of Pumpcrete machine. Grill prevented lumping of mix.

FORM COSTS HALVED

(Continued from page 138)

Concrete for the columns was placed by buggies working from transit-mix trucks.

● **Slab Pours.** In casting the slab, sections between the expansion joints, about 120 ft., were staked off and poured in a single day. The first section of the Jackson-Van Buren block had an area of 120 x 36 ft., with slab thickness varying between 24 and 30 in. Shoring consisted of conventional 6 x 6 in. posts topped by 4 x 6 in. caps and 4 x 6 in. stringers, posts spaced 4 x 6 ft. Universal panels were used for the slab forming. About 200 tons of reinforcing steel was used for the block-long section. The 34E paver, stationed on the upper level received dry batches from a fleet of Diamond T trucks from the yards of Material Service Co., and chuted the mix down to the Pumpcrete machine on the lower level. The

mix was pumped into place through 8-in. lines, made up of 10-ft. sections. It is estimated that the contractor saved about \$1.00 a cu. yd. with this method of pouring compared with crane or crane-and-buggy handling. The entire deck pour contained 476 cu. yd. Darex was the air entrainment additive on the work.

The job sequence was to deck the upper level first, then construct the lower, ground-level roadway as the second step.

The Jackson-Van Buren section in this contract awarded at \$911,697, was started November 7, 1955, and scheduled to be completed in 400 days. Both upper and lower roadways include an asphaltic concrete pavement.

The project is under the Bureau of Engineering, city of Chicago, Dick Van Gorp, chief engineer, Jim Shimek, resident engineer, and Bob Downs, superintendent of construction for the Herlihy Mid-Continent Co.

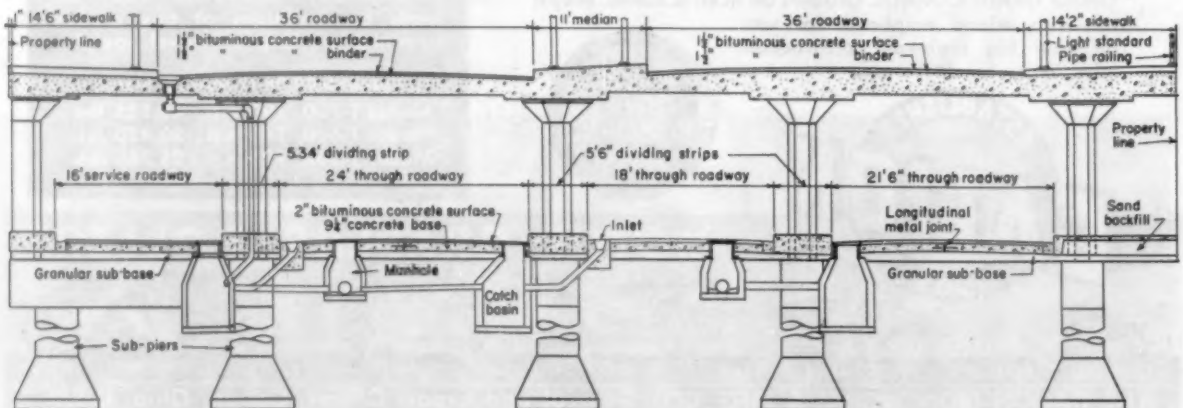
Harvester Continues School for Mechanics

One of the most ambitious industry training schools in the country is said to be that of "Melrose Tech," which was opened in January of 1956 by International Harvester Co. at its Melrose Park, Illinois, plant.

With the central objective of helping equipment owners reduce down time and increase their job efficiency, the school has a curriculum plan to teach operators and mechanics how to perform preventive maintenance and repair and get the best use out of equipment.

About 400 personnel of contracting and other user organizations made use of the course during its first weeks, led by a staff of 14 instructors. The school is continuing strong this year.

There are 59 different courses to choose from, built around the different International Harvester machines.



● Typical cross-section of double-deck for Wacker Drive project.

Technical Digest

by John C. Black

New Studies in the Sonic Testing of Materials

Modulus of elasticity of a solid can be determined from its frequency of sonic vibration, and the sonic method offers much of both economy and convenience. The method also measures moment of inertia and has the great advantage of being applicable to irregular sections geometrically difficult to calculate.

"This type of testing falls under the heading of non-destructive testing, that is, the sample is not modified or destroyed in the course of the tests. Non-destructive tests are an important tool of the engineer. They permit him to reach sound conclusions as to the strength and quality of a concrete structure without expensive waste of materials for testing. An adaptation of the equipment used in this series of experiments makes it possible to estimate accurately the strength of existing structures as much as 50 ft. thick." Tests by the authors were limited to 6 x 12-in. cylinders.

A brief historical review of the subject is followed by description of the method and its application, including statement of the fundamental formula but not its derivation. Equipment descriptions and set-up diagrams are included, together with sample test charts showing agreement within 15 percent between testing machine and sonometer results before application of correction factors, and within 3 percent after application.

A station wagon and a three man crew are sufficient to carry the equipment and make the tests at any desired location—a notable advantage over testing-machine immobility.

The tests here described were carried out in the civil engineering laboratory of Bucknell University, Lewisburg, Pa., where the authors were formerly civil engineering students. Carl Kindig, professor of Civil Engineering, was director. This article was the winning paper in the contest at the 18th annual Philadelphia-Lehigh Valley Student Chapter Conference, Amer-

ican Society of Civil Engineers, held at Princeton University on April 23, 1956. A bibliography references is given.

"Sonic Method Proves Valuable for Testing Concrete Specimens" by C. C. Armstrong, Structural Engineering Division, Stone & Webster Engineering Corp., Boston, Mass.; R. B. Ulp, Graduate Student, Civil Engineering Department, Cornell University, Ithaca, N. Y.; and K. C. Larson, Jr., Junior Hydraulic Engineer, Pennsylvania Department of Forests and Waters, Harrisburg, Pa. Civil Engineering, American Society of Civil Engineers, 33 West 39th St., New York 18, N. Y., November 1956. (Price 50 cents).

Test Bearing Capacity of Drilled Piles

The Los Angeles district of the Corps of Engineers has recently completed a pile load test at Edwards Air Force Base which proved that piles cast in drilled holes have high bearing capacity. The load test was conducted on a 16-in. diameter pile with a length of 22 ft. The foundation material consisted of 10 ft. of loose sand underlain by relatively dense sand. The pile failed under a total load of 180 tons, which was 3.6 times the design load of 50 tons.

The load test was brought about by difficulty in reaming bells for the footings of the two base maintenance hangars. The contract plans indicated that the hangars would be supported on belled footings located on dense sand or bedrock. Each footing consisted of a 16-in. diameter vertical shaft with a bell bottom sized for a bearing of 6,000 lb. per sq. ft. Drilling the vertical shaft was a cinch; however, when bell operations were attempted in the clean sands, the holes caved so badly that the bells could not be completed. After reviewing the construction conditions the bells were deleted and the 16-in. diameter shaft extended into the dense sand sufficiently to pick up a bearing capacity of 50 tons (the

maximum load on any column). A pile length of 22 ft. was chosen because this length would give an embedment of at least 10 ft. into the dense sands.

The test pile was located in the area having the greatest depth of loose surface sands, midway between two 40-ft., 18-in. diameter anchor piles 24 ft. apart. After the holes were drilled the reinforcing steel was set in the holes and the holes were filled with concrete made with high early strength cement. The reinforcing steel for the test pile consisted of four No. 6 bars extending the full depth of the hole. The steel for each anchor pile consisted of seven No. 12 bars extending from 4 ft. above the ground surface to the bottom of the 40-ft. holes. Five days after the concrete was poured the protruding bars in the anchor piles were welded to vertical H-piles and the testing equipment was assembled over the test pile.

After reviewing the test data and the foundation conditions at the two hangars it was concluded that 22-ft., 16-in. diameter piles would adequately support the maximum design load of 50 tons. It was also concluded that switching from belled footings to vertical piles was an excellent solution for an unexpected construction problem.

From article by Claude A. Fetzer and Gene T. Mahoney, Southwest Builder and Contractor, September 14, 1956.

How Colorado Studies and Controls Snow Slides

Major snow slides usually occur in altitudes over 8,500 ft., most of them on slopes of 30 degrees or more. Depth to which highways are covered ranges from one to 40 ft., the distance along the highway being generally less than 200 ft. Greatest distance covered is about one quarter mile by a slide which runs year after year in the same location.

Repeating slides of this character usually carry only light debris such as small branches, bits of rock, and weeds, but new slides or slides which run infrequently bring down trees, larger rocks and other materials often buried out of sight in the snow mass and presenting a hazard to rotary equipment. All rotaries are equipped with safety devices to release the drive when heavy objects are hit. Many trees have to be sawed or chopped off.

High altitude snow may be of either flaky or gritty character and when compacted by wind and settlement commonly weighs between 16 and 17 lb. cu. ft. by spring. However, large slides coming to an abrupt stop after a long run may compact even dry snow to as much as 39 lb./cu. ft.

Factors contributing to avalanche hazard are discussed at length under the following heads: 1. Old Snow Depth, 2. Old Snow Surface, 3. New Snow Depth, 4. New Snow Type, 5. Average Density, 6. Snowfall Intensities, 7. Precipitation Intensity, 8. Settlement, 9. Wind, 10. Temperature. These factors are variables, with frequently complex relations, and it is only by careful study that we can begin to predict the time and place of slides. Instruments for necessary studies and records are listed.

When it is determined that a slide is imminent and a storm is not in progress the highway is blocked off on each side of the section where the slide would cross and shells are fired from a 75 mm cannon into the snow mass at the point where the slide normally breaks or starts. This does not always start the run but if it fails to do so the explosion tends to stabilize the mass and make it safe until new conditions develop.

There are at least four causes by which a slide may be started—weights, sheering, temperature and vibration—and the starting cause may be of very slight intensity. The cut of a pair of skis may do it, a rumble of machinery, a clap of thunder or even the vibrations of a loud shout.

"The Snow Slide Problem on Colorado's Main Highways" by Mark U. Watrus, Chief Engineer, Colorado Department of Highways, American Highways, American Association of State Highway Officials, 917 National Press Building, Washington 4, D. C., October 1956 (price 50 cents).

Stabilization of Heavy Clay

An experiment has been carried out on some 80 yards of road on a new housing estate in which a single-pass stabilizing machine was used to stabilize the heavy clay subsoil. Granular materials and hydrated lime have previously been used to facilitate the comminution of clay soils stabilized with portland cement. An investigation was carried out to determine whether these

materials affected the performance of the single-pass machine in this respect. Consideration is given to details of soil preliminary testing, plant used, construction, and tests carried out during and after construction. Six months after completion of the main construction one section of the base was surface dressed and two others were given different bituminous surfacings. After 12 months of service, including a severe winter during which the soil-cement was protected only by a surface dressing and was trafficked by builders' supply vehicles, the areas which were subsequently carpeted remain in excellent condition.

By A. E. Cruchley, Roads and Road Construction, London, 1956, 34 (402), 164-8. Road Abstracts, Vol. 23, No. 9, p. 199, September 1956.

For More Effective, Economic Weed Control

A new product for the control of ragweed and poison ivy was noted by Alfred H. Fletcher of the public health section of the Weed Society of America in the award of a citation to the Commonwealth of Massachusetts and to Mr. John A. Volpe as Commissioner of Public Works. The award was made at the 1956 convention of North Atlantic States Highway Officials.

Two ragweeds which cause hay fever and asthma (*ambrosia trifida* and *ambrosia artemisifolia*) flourish along highways unless rigorously controlled. The State of Massachusetts has been conspicuously efficient in eliminating them, said Mr. Fletcher:

"Barely ten years ago a new herbicide, 2,4-D was discovered that would kill broad leaf plants but would not harm grasses. The ragweeds are not only broad leaf plants but are extremely sensitive to the effects of 2,4-D. More recently another herbicide has been developed called 2,4,5-T which kills poison ivy most effectively. Now weed control can be directed against both ragweed and poison ivy."

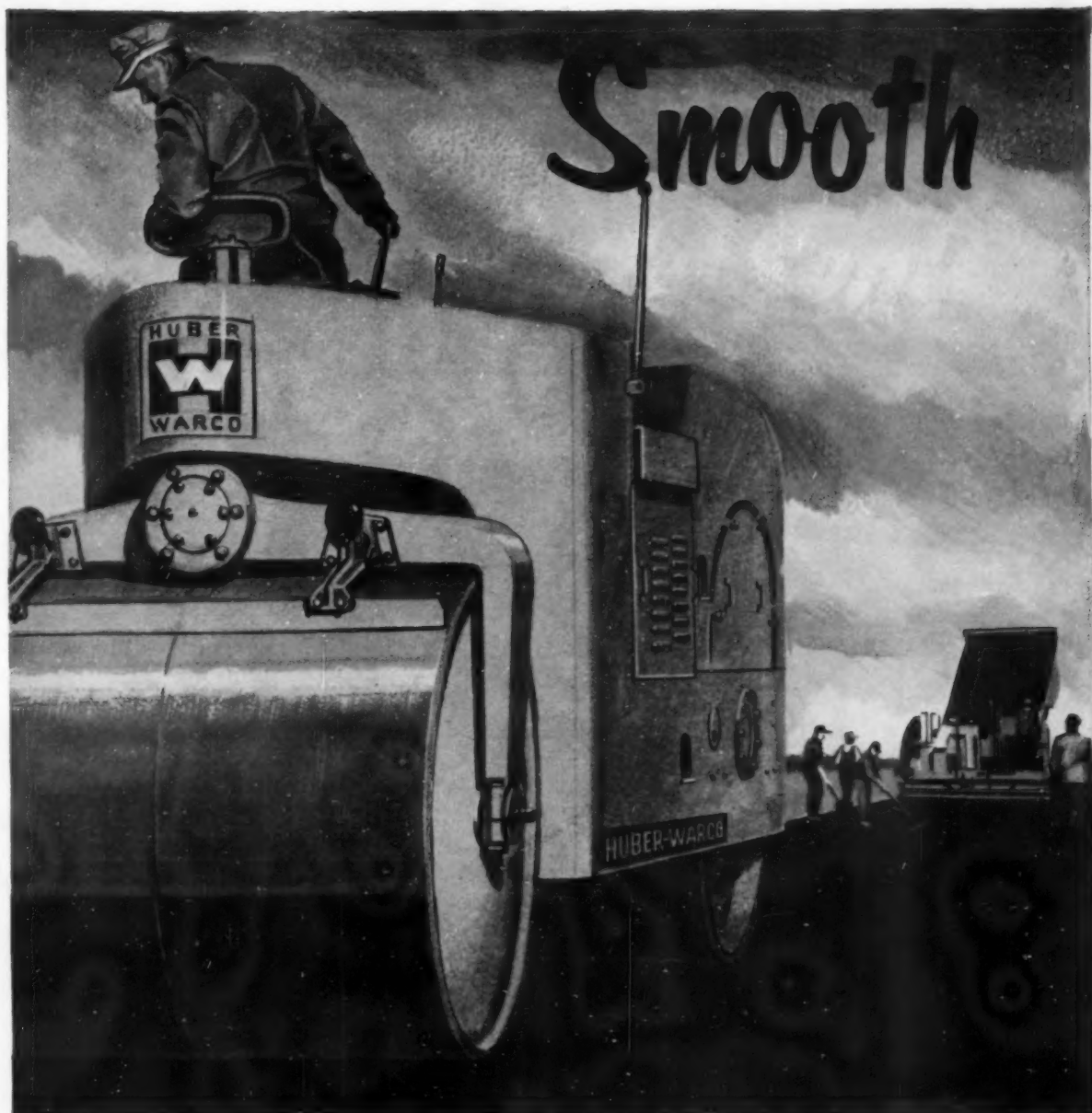
Proceedings of the Thirty-second Annual Convention, Association of Highway Officials of the North Atlantic States, 1035 Parkway Ave., Trenton, N. J., 1956.

APOLOGIES . . .

A picture of an electronic computer, part of the story *Where Are We in Electronic Computer Application*, Roads and Streets, March, p. 98, was erroneously captioned as being taken at the office of DeLeuw, Cather & Co., consulting engineers, Chicago. The photo actually was taken in the quarters of H. W. Lochner & Co., consulting engineers, 150 N. Wacker Dr., Chicago.



HONORED BY THE MOLES. The two 1957 Moles Award winners and the principal speaker at the recent Award Dinner in New York City: Louis R. Perini, member Award winner, Guy F. Atkinson, non-member Awardee, at right. Between them is Jess Honeycutt, director of Bethlehem Steel Corporation and banquet speaker. He, like Mr. Atkinson, was made an honorary member of The Moles, a fellowship of men who have made their mark in the heavy-construction industry.



HUBER-WARCO TANDEM ROLLERS For top performance and efficiency at ALL rolling speeds, Huber-Warco medium and large size tandem rollers offer the combination of a torque converter, tail-shaft governor and two-speed transmission. Models are gasoline or diesel powered in sizes of 5-8, 8-10, 8-12 and 10-14 ton. A 3-5 ton tandem with torque converter and water-cooled engine is also available. See your nearest Huber-Warco distributor for details.



HUBER-WARCO COMPANY

Marion, Ohio, U. S. A.

... for more details circle 324, page 16

ROADS AND STREETS, April, 1957

PROVED IN **29** STATES...

~~23~~
~~19~~
~~13~~



Rock-Salt-Stabilized Roads Cost Less to Maintain

Latest reports show road stabilization with rock salt is now being done in 29 states—and the list is growing rapidly!

In a great majority of cases, the product used for this modern stabilization technique is Sterling Rock Salt. Reason: Sterling Rock Salt—when used for stabilizing base courses and shoulders, as well as gravel roads—improves durability, and cuts maintenance costs in a number of ways.

Resistance to Moisture. During heavy rains the salt and fines in stabilized soil form a barrier to the seepage of moisture from any direction.

Great Density...is one of the important features of a rock-salt-stabilized road.

This is achieved by the retention of water-of-compaction during rolling operations. Thus, the road resists weathering—which causes changes in the shape of roads.

Anti-freeze Action. The presence of salt in stabilized aggregate results in a reduction of the freeze-point to 25° F. or below. The occurrence and severity of frost heaving are greatly reduced—and resultant surface breakup is minimized.

Salt stabilization is quick, too. In most stabilization work, Sterling Rock Salt is simply mixed with aggregate, wetted down, and rolled until the surface is hard and compact.

FREE TECHNICAL ASSISTANCE

Rock-salt-stabilization procedures vary with

particular soil and road conditions. For expert advice on how stabilization can work in *your* area, contact International. An International "Salt Specialist" will be glad to help you work out an effective, money-saving rock-salt-stabilization program.

He'll show you facts and figures on actual road-stabilization jobs. And he'll work with you on application procedures, specs, etc. Just contact your nearest International office.

Sales offices: Atlanta, Ga.; Chicago, Ill.; New Orleans, La.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Newark, N. J.; Buffalo, N. Y.; New York, N. Y.; Cincinnati, O.; Cleveland, O.; Philadelphia, Pa.; Pittsburgh, Pa.; and Richmond, Va.

STERLING ROCK SALT

PRODUCT OF INTERNATIONAL SALT CO., INC.
SCRANTON 2, PA.

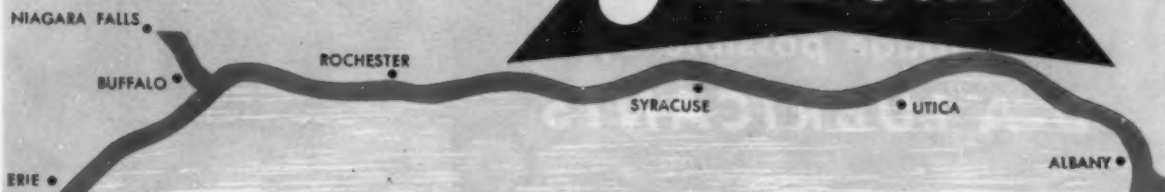
... for more details circle 253, page 16
ROADS AND STREETS, April, 1957

New York State Thruway

Uses

ALLIED

Jet Seal



Equipment for laying Allied JET SEAL comes in one compact unit that assures proper installation.



Allied JET SEAL is contained for maximum protection, quick identification and easy mixing.

ALLIED MATERIALS CORP.

GENERAL OFFICES—Braniff Bldg., Oklahoma City, Okla., Phone RE 9-0592

PLANTS—Stroud, Okla.—Detroit, Mich.—Los Angeles, Cal.—

New Market, N. J.—Burlington, Ontario (Canada)

The New York State Thruway is one of the most modern and up-to-date traffic arteries in the world. It now stretches 427 miles from New York City to Buffalo and is being extended five ways—to Erie, to Niagara Falls, to Massachusetts, to Connecticut and New Jersey.

To protect the tremendous investment in this beautiful highway, the Thruway Authority seeks only the best materials for construction and maintenance. Here, Allied JET SEAL has won distinction as the preferred sealant for protecting the more than 500 bridges on the super-highway.

Allied JET SEAL is outstanding for its extreme ruggedness, superior adhesion, cohesion and low temperature ductility. Allied JET SEAL has no cold flow tendencies even above 300°. It is easily applied, sets up quickly, and is ready for traffic with minimum delay. The Thruway Authority believes that its greater life expectancy makes it more economical, in the long run, than the less effective sealants it is destined to replace.

**PRODUCERS, REFINERS
AND COMPOUNDERS
FOR OVER 25 YEARS**

NEW YORK

... for more details circle 318, page 16

ROADS AND STREETS, April, 1957

16,000 Hours without engine overhaul ... made possible by D-A LUBRICANTS



"We went over 16,000 hours on a Caterpillar D13000 Engine in a Lorain 77 Shovel—without overhauling!" Tom Palazzi, Frank Palazzi & Sons, Inc.

**24-hour delivery
anywhere in the U.S.A.**



Leading contractors who standardize on D-A Lubricants, including Frank Palazzi & Sons, Inc., well-known New England contractor, expect—and consistently get—8,000, 10,000, 12,000 and even 16,000 hours of heavy-duty service from their engines between overhauls.

Frank Palazzi & Sons recently clocked more than 16,000 hours on a diesel engine without overhaul...

and this is no isolated example. The D-A Representative in your territory can show you case-history after case-history on outstanding performance and long engine life resulting from the use of D-A Lubricants. Many of these reports may well be from contractors whom you know personally in your own area.

Ask your D-A Representative to show you the actual performance records... records you yourself can verify, if you wish.

D-A makes equipment last longer.



D-A LUBRICANT COMPANY, INC. • Indianapolis 23, Indiana

Court Decisions

Contractors Should Know

Contractor's Liability Under Government Contracts

Judgment against a contractor for damages to a property owner in the performance of a Pennsylvania highway construction contract was set aside a few weeks ago by the supreme court of that state.

This public contract with the Highway and Bridge authority of that state provided for the construction of a portion of the Philadelphia expressway including a fill 35 ft. in height, extending from 1000 to 1500 ft. It crossed a narrow stream which fed five artificial ponds in the Valley Forge gardens and flowed through a steel pipe culvert in the embankment. Upon the completion of the fill, dirt and silt carried by the stream from the embankment had filled these ponds.

This suit was brought against the contractor to recover the expense of the dredging and desilting of the ponds. In the defense of the contractor to this action it was maintained that all of the work had been done in strict compliance with the plans and specifications of its contract with the Commonwealth of Pennsylvania.

As authority for its reversal of this judgment against the contractor for these damages the court referred to a case decided by the Supreme Court of the United States a few years ago. In that instance damages had been claimed by a Nebraska land owner against a contractor for the erosion of 95 acres in the construction of dikes on the Missouri river. This work has been done under the direction of the Secretary of War for the improvement of navigation and had been authorized by an act of Congress.

There the court had said in holding that the contractor, having performed this work under contract with the federal government, was not liable for such injuries, "It is clear that if this authority to carry out the project was validly conferred, that is, if what was done was within the constitutional power of Congress, there is no liability on the part of the contractor for executing its will."

Then in applying the law here laid down by the Supreme Court to the determination of the claim for damages in this action for the construction of embankment in Pennsylvania, that court said in conclusion:

"In every jurisdiction in this country where the question has been passed upon, and that includes the Supreme Court of the United States, other federal courts and courts of approximately half of the states, it has been uniformly held that in the absence of negligence or wilful wrong conduct on the part of the independent contractor, he is not liable for injury to another's property which is caused by the performance of his contract with the governmental instrumentality in accordance with its plans and specifications.

"If the rule were otherwise, the bidding on contracts with a governmental agency would be somewhat hazardous because the contractor would never know the amount of damages which he might have to pay to abutting property.

"The contractor's bid is based upon the theory that the public agency has a legal right to submit its plans and specifications for the work to be performed and that if he performs the work in accordance with the plans and specifications he will incur no liability in the absence of negligence."

Valley Forge Gardens v. James D. Morrissey, 123 Atl. 2d 888, Pennsylvania, June 25, 1956
Yearsley v. W. A. Ross Construction Co., 309 U.S. 18, January 29, 1940

Contractor Hazard Warnings

Engaged in the black topping of a section of highway in Davies County, Kentucky, the contractor's roller completely obstructed one of the two traffic lanes. Reaching the crest of a hill a driver saw the roller approaching in his lane of traffic. Shut off from passing at the right by an embankment he swerved to the left, hitting and injuring three women on that side of the road.

In the action brought for their

injuries, the court said in holding the contractor liable for a failure to warn of this construction operation, "It is the duty of a road contractor to provide and maintain adequate and proper notice of hazardous conditions arising from highway construction work."

State Contracting & Stone Co. v. Fulkerson, 288 S.W. 2d 43, Kentucky, March 9, 1956

Lien Against State Agency

Action was brought for the foreclosure of a lien by a subcontractor in the construction of the New York Thruway. Dismissal of the suit was asked by the general contractor on the ground that the Thruway Authority was an independent government agency which could not be sued without its consent.

Refusing this request the Supreme Court of that state said, "The Supreme Court has jurisdiction to determine whether there is any sum in the hands of the state chargeable with liens in favor of those who have furnished labor and material on a public improvement."

Elliott v. De Felice & Son, 144 N.Y.S.2d 185, New York, September 9, 1955.

Alternative Highway Bids

Advertisements of the Connecticut state highway department were published for alternative bids for the construction of a highway of bituminous concrete and of reinforced concrete. Low bids were by one contractor for reinforced concrete and by another for bituminous pavement.

In a suit for an injunction against the award of a contract to the bituminous pavement bidder it was contended that the highway commissioner could award the contract only to the lowest bidder irrespective of his preference for either type of pavement. The court held, "Awarding officials may choose between different kinds of materials and let the contract for the kind they honestly believe to be of better quality or more suitable than another kind."

L. G. de Felice and Son v. Argraves, 118 Atl. 2d 626, Conn., November 3, 1955

Duty of Motorist

On U. S. Highway 79 at Camden, Arkansas, a motorist following detour signs came to a portion of the

road covered with recently dumped gravel. Cautioned by workmen to "take it easy" he did so for a mile, then, seeing no construction work ahead, resumed a 40 mph speed.

Downgrade on a wide curve the road appeared to extend to the crest of a hill ahead. What this motorist did not see was a missing bridge with a detour over a narrow and temporary bridge with no display of warning or detour signs. Only the left wheels of his car reached the bridge and both driver and car rolled into the ravine.

In sustaining a judgment for \$2,000 against the contractor, the Supreme Court of that state said in its review of the judgment on appeal, "In the absence of notice to the contrary a driver on a highway open to the public ordinarily has a right to rely on the assumption that the highway is in a reasonably safe condition for travel and free from obstructions and he need not keep his eye constantly fixed on the road."

McGeorge Contracting Co. v. Mizell, 226 S.W.2d 566, Arkansas, January 30, 1950.

Extra Compensation

Specifications of a contract for the construction of 1.07 miles of highway in Wisconsin contained an estimate of 114 cu. yd. of loose rock and 57 cu. yd. of solid rock. Final results showed 945.30 cu. yd. of loose rock and 442 cu. yd. of solid rock.

In its determination of a suit brought by the contractor for extra compensation based on the discrepancy of these estimates the Supreme Court of that state said, "A contract between an individual and the state is to be construed and the liabilities of the parties under it are to be determined by the same rules as govern contracts between individuals."

"A contract lawfully entered into by agents of the state and another is to be carried out in good faith on both sides and when so placed by act of the state that it becomes necessary for him to incur the burden of extra work in order to complete the job agreed upon, is entitled to just compensation."

McDonald v. State, 235 N.W. 1, Wisconsin.

Proof Needed for Bond

In a lawsuit against a surety for material and services furnished in the construction of a Texas high-

way, the sub-contractor failed to show the amount of labor and material used. In its denial of the subcontractor's claim the Texas court said:

"In order to recover on a bond, as in the present case, it is necessary to show that the labor and materials furnished the contractor were used on the job and that the same were consumed or wholly depreciated in the process of the construction work."

National Surety Corp. v. Dabney, 282 S.W.2d 70, Texas, September 15, 1955.

Guest's Obligations

Driving at less than thirty miles an hour, the left front wheel of a car hit a two foot pile of gravel—of the same color as the roadbed—that had been dumped in the middle of the highway. Catapulted from the car when it skidded into an eight foot ditch, the wife of the driver was injured.

In its defense to the suit by the woman, the contractor maintained that she had been guilty of contributory negligence. Of the duty of a wife as her husband's guest under such circumstances the court said, "It is the duty of an invited guest with knowledge of approaching danger, in the exercise of ordinary care, to protest to the host, if there is time and opportunity, unless it reasonably appears that such protest would be unheeded or would be of no avail, and for failure so to do the guest would be chargeable with contributory negligence."

Kusha v. Nichols Construction Co., 48 N.W. 2d 682, Nebraska, July 5, 1951.

Surety Liable to Claims

Suit was brought by a materialman against the general contractor on a Maine highway project for tires, tubes, vulcanizing and retread services. When judgment was recovered by the materialman the contractor was bankrupt. Action was then instituted against the surety on its contract bond that the general contractor "shall pay all bills for labor, material, equipment and for all other things contracted for or used in connection with the work contemplated by said contract."

In awarding the materialman a recovery against the surety the court said, "The surety is obligated to pay such claims when substantial con-

sumption in the construction of a particular highway project is proved."

Carpenter v. Susi, 121 Atl. 2d 336, Maine, March 5, 1956.

State Immune from Suit

Suit was brought in Colorado for the recovery of \$5984.04 for gravel at 12c a ton. In its defense the state maintained that the action could not be brought as the state was sovereign and immune from lawsuits without its consent. In upholding a judgment against the state it was said by the court:

"If the arguments presented by the state were to prevail, then no one in the position of this contractor would feel secure in making any contract for the purchase of their material. The enforceability of agreements such as here made to supply material for public work are controlled by the same factors that control the validity of contracts between private persons."

State Highway Department v. Dawson, 253 Pac. 2d 593, Colorado, November 17, 1952.

No Barriers or Warnings

While a Tournapull, an earth moving machine over 32 feet in length and between 10 and 11 feet wide, was at work on a street improvement job in Charles City, Iowa, a man attempted to cross the street, slipped and fell under the rear wheel of the machine which was in reverse at the time of the incident.

On appeal from a judgment denying this victim of the accident a recovery, he contended that liability for such injuries rested on the contractor for the failure to erect barriers or warning signs. Affirming the decision of the lower court that the victim of this accident had been guilty of contributory negligence the Supreme Court of that state, giving an opinion on the responsibility of pedestrians in these situations said:

"Where the necessary work of improving or repairing public pavements on streets and sidewalks is in open progress in broad daylight, watchmen, barriers and signals for the protection of the public are not required, since existing conditions at such a time give their own notice of danger, if any."

Draeger v. Heckman-Reynolds Co., 78 N.W. 2d 851, Iowa, October 16, 1956.



Salt stabilization builds better roads

Stabilizing with Morton Salt means added road life and reduced maintenance costs.

Stabilizing a road with Morton Salt is often the difference between a good road that will stand up under heavy traffic and a road that will require excessive maintenance within a year.

Secondary roads. Regardless of the materials used, roads stabilized with Morton Salt give more service per dollar than roads built by any other method—and the savings in aggregate alone more than pay for the salt. You get smooth, durable, water-repellent surfaces that require minimum maintenance.

Primary roads. Stabilizing the base course with Morton Salt helps prevent the 9 out of 10 road failures which result from faulty foundations.

Shoulders. Stabilizing shoulders with Morton Salt not only checks erosion and rutting, it reduces dust and eliminates accidents caused by soft shoulders . . . also saves on grass and weed removal.

- ☐ Please send me your free booklet on salt stabilized roads.
- ☐ I also would like free technical assistance from a Morton Road Building Engineer.

Name _____
(Please print)

Title _____

Address _____

City _____ County _____ State _____

MORTON SALT COMPANY

INDUSTRIAL DIVISION

Dept. RS-4, 120 So. LaSalle Street,
Chicago 3, Illinois



. . . for more details circle 276, page 16

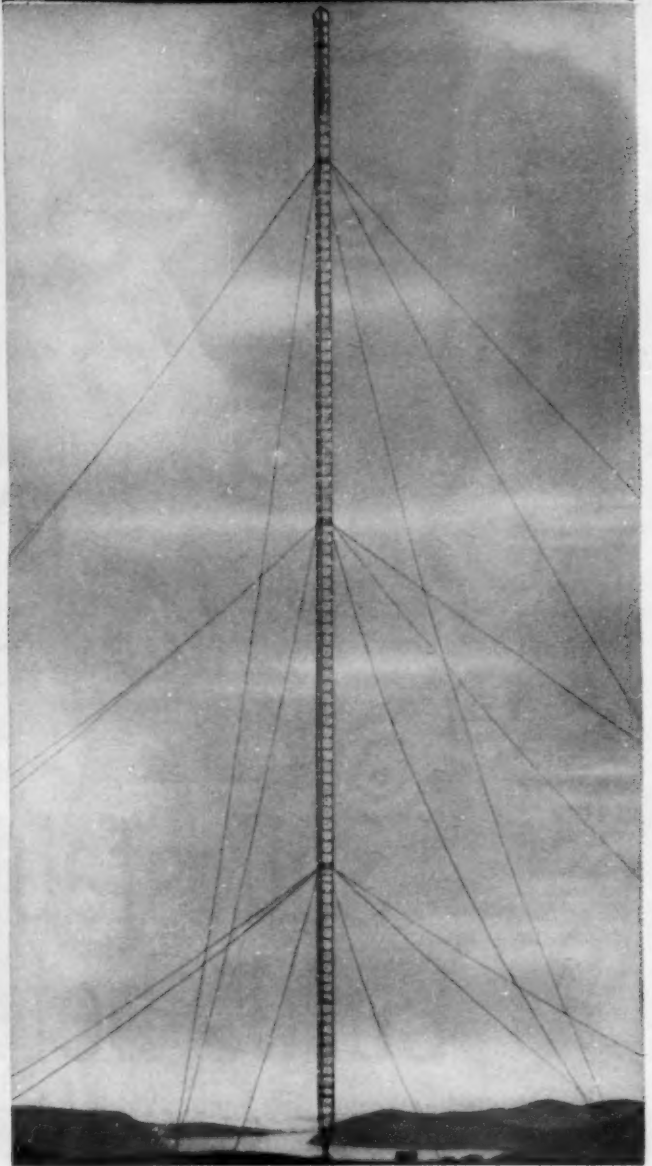
ROADS AND STREETS, April, 1957

A TUNNEL..



THE TUNNEL: A Liberty Mutual policyholder had a contract to build a twenty-seven mile aqueduct through the Catskill Mountains. The tunnel on this project involved two intermediate shafts, and the outlet portal that had seven headings, in operation twenty-four hours a day, five days a week. To service this job, Liberty Mutual opened an office in a nearby community. On-the-spot experienced Loss Prevention Engineering, claimsmen on the job site and the full cooperation of the contractor, resulted in the return to the contractor of more than \$700,000 as retrospective premium savings.

A TOWER..



THE TOWER: One of the toughest jobs in the Thule project was the erection of a 1206-foot tower. Despite hazardous conditions in Arctic gales, only one minor accident resulted on this intricate but small part of the job. Liberty engineers watched over the safety of the thousands of construction workers on the whole Thule project. The accident record there was 75% better than the U. S. record for construction companies. Liberty's engineering approach to accident prevention and the cooperation of the contractors reduced losses. The final insurance cost for the project was millions of dollars less than expected.

For 20 straight years — the nation's largest writer of Workmen's Compensation Insurance

A THRUWAY



Three jobs that
prove it pays
to insure with
Liberty Mutual
no matter
what you build,
no matter
where you build

THE THRUWAY: Liberty insured 64% of the mileage on the New York Thruway. The contractors worked with Liberty to put safety first. As a result of the excellent loss record, dividends and retrospective premium returns approximated a *million dollars*. Before work began, Liberty analyzed potential hazards, then kept on top of problems through local offices. Liberty engineers were always on hand and, when accidents occurred, Liberty claimsmen were on the spot to provide service. Loss Prevention Engineering has helped make Liberty Mutual the leader in compensation insurance.

... for more details circle 264, page 16



LIBERTY MUTUAL

The Company that stands by you

Liberty Mutual Insurance Company • Liberty Mutual Fire Insurance Company • Home Office: Boston.

WANTED:
TRUCK OPERATORS
Who are Ready to
Swap Maintenance
Costs for Profits!

Performance records show that maintenance expenses, a major item in lower with Eaton 2-Speed

engines operate in their most efficient and economical speed range, reducing stress and wear. Repairs and replacements are needed less frequently; trucks stay on shop. Trouble-free

trouble-free engines are added to engine and over-all vehicle life.



EATON 2-SPEED AXLES

Keep Trucks Out of the Shop!

Whenever you cut down on wear and tear—keep trucks on the job, out of the shop—you're adding to profits three ways: 1—By keeping trucks earning, not costing. 2—By saving the expense involved in interrupted service and delayed trips. 3—By cutting actual parts-and-labor maintenance costs.

That's exactly what Eaton 2-Speed Axles do. By furnishing the right gear ratio for every operating condition, they reduce stress and wear on engines and all power transmitting parts. In addition, Eaton 2-Speed Axle trucks last longer, haul more at lower cost, and are worth more on the trade-in.

It all adds up to this: when you specify Eaton 2-Speed Axles, you're swapping expenses for profits!



More than Two Million
Eaton Axles in Trucks Today.
For complete information,
see your truck dealer.

EATON

AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO



PRODUCTS: Engine Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Hydraulic Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Forgings • Heater-Defroster Units • Automotive Air Conditioning • Fastening Devices • Cold Drawn Steel • Stampings • Gears • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

Summary Report on the Status of

Flexible Pavements For Heavy Military Aircraft

By Arvin S. Wellborn

Chief Engineer, The Asphalt Institute

Editor's Note: The newest design criteria for very heavy military planes may be compared with previous criteria by referring to "Air Force Issues New Criteria for Runway Design", Roads and Streets, July, 1956.

(See also page 216 of this issue)

IN RECENT weeks, elements of the engineering press, armed with insufficient information, have attempted to appraise the status of flexible pavements for modern military airfields. These appraisals have been based on incomplete data from a single pavement test conducted during the summer of 1956 at Kelly Air Force Base in Texas.

It is the considered judgment of The Asphalt Institute, after an extensive review of all the facts, that the test at Kelly AFB could have ended no other way than distress in the asphalt section. A combination of factors, readily understood by asphalt technologists, doomed the pavement to failure before the first test loading was placed on it.

Further, since the suspension of testing at Kelly, new pavement test loading conditions have been established that are totally unprecedented in the history of pavement design. In fact, the new conditions have removed pavement design entirely from the realm of contemporary paving technology and placed it in a new and uncharted dimension.

It must be borne in mind that flexible pavements today are serving fully the requirements of our heaviest bomber aircraft at many

Air Force installations. Consequently, we must apply very critical judgment to the results of the Kelly test and ask: Why failure here?

Because the accounts of the Kelly AFB test have lent themselves to gross misinterpretation, seriously injuring the reputation of all flexible pavements, this engineering examination of the situation must be offered.

• *History.* Some elements in the Air Force long have expressed dissatisfaction with flexible pavement and, in 1954, announced they were specifying concrete paving for those "critical" areas subject to jet afterburner blast and excessive fuel spillage which might have a harmful effect on asphalt pavements. In December of 1955, the Secretary of Defense authorized the Air Force to extend the term "critical" to include all "primary use areas," including those areas not subject to this spillage and heat blast. In defense of its new policy, the Air Force claimed failures in flexible pavements wherever the channelized traffic of the new B-47 bombers was applied. Seven heavy bomber bases were cited where such failures were alleged to have occurred.

Granted permission to inspect these fields, The Asphalt Institute

determined that only three of the seven airfields showed distress that could not be corrected with normal maintenance procedures. In the three cases of severe distress the cause was traced to faulty design or construction. In one instance elementary drainage had been largely neglected. At another base, it was learned that distressed areas had not been compacted before paving. In only one case was the distress traced directly to the asphaltic concrete surface and in this instance the pavement did not meet the design requirements. In most cases, proper maintenance operations were virtually non-existent.

The U. S. Corps of Engineers expressed their confidence that asphalt pavements are entirely capable of withstanding the channelized traffic and supported this position with data from test panels constructed at their Flexible Pavements Branch at Vicksburg, Mississippi. The Air Force declined to accept this as conclusive evidence and requested that a demonstration-type section be constructed under normal contract conditions. Kelly Air Force Base was selected.

Existing criteria were applied to the test sections, except that the test loading requirements were increased from 1500 to 30,000 coverages of 100,000-lb. dual-wheel loads under accelerated traffic and at pavement temperatures in excess of 90°F. (It should be noted that this increase in coverages was a 20-fold increase at high temperatures for flexible pavement. At the same time the increase in coverages for the rigid section was only six-fold.)

During the construction of the pavement, it became apparent to The Asphalt Institute, serving as an observer, that the paving mix required by Air Force mandate was clearly too rich to sustain the accelerated test traffic immediately after construction, in the mid-summer Texas heat. Any experienced asphalt technologist knows how an over-rich asphalt mix will behave.

When the Institute's worst fears were realized and the pavement showed early distress, the asphalt industry proposed that the faulty test section be removed and reconstructed with a more appropriately proportioned mixture. The Air Force declared itself satisfied with the results and ordered the tests terminated—although normal procedure by experienced engineers under these circumstances would have been to modify the mix, making it leaner, and re-test.

WHAT THE TEST PAVEMENT WAS UP AGAINST—

Let us summarize the mixed factors that were jammed into the Kelly Field test equation:

1. The Air Force required the asphalt pavement to be designed on the basis of criteria established with 1500 coverages of accelerated test traffic at high temperature.

2. Test traffic applied at Kelly, however, was 30,000 coverages, or twenty times the amount on which the pavement mix design criteria were based.

3. All test traffic was applied at Kelly under high pavement temperature conditions, a situation not encountered in actual airfield pavements. As any technologist knows,

this is abnormally severe for asphalt pavement and not similarly severe for rigid pavement.

4. Spacing of test traffic load wheels was twenty feet instead of approximately forty feet, as for the B-47 aircraft. This factor may have eliminated for all practical purposes rebound and recovery factors and induced interfacial stresses of a high order of magnitude.

5. So called "anti-strip" additive was placed in the hot asphalt mixture. This procedure is contrary to the published policy of The Asphalt Institute and could have contributed to the distress that developed.

● *Analysis of the Test.* For reasons not entirely clear, the test called for 30,000 coverages at accelerated rate of the 100,000-lb. gear load at pavement temperatures not lower than 90°F.—although it is apparent that these extreme conditions will never be encountered in actual airfield operations. The existing mix design criteria then in use by the Corps of Engineers called for 1500 coverages of accelerated traffic under high pavement temperatures. Pavements designed by these criteria are today carrying heavy bomber traffic without distress.

The decision to step up the tempo of the accelerated traffic in the hottest summer months must be recognized as an unrealistic requirement. This accelerated traffic coverage was scheduled at a rate of 500 coverages per day which is the equivalent of a full month's usage of the pavement under prototype traffic. To withstand this type of testing it is only logical that the asphalt mixture should have been designed with a proportionately leaner asphalt content. This was recognized by the Corps of Engineers. However, they were not given the opportunity to adjust the mix and re-test.

In effect, the Kelly test was no test at all. This was recognized by an official of the Corps of Engineers who, at a conference of the interested parties, later declared the asphalt concrete surface placed on the demonstration test section at Kelly AFB was, in his opinion, still the best flexible airfield pavement for *prototype traffic* and a pavement just a little bit leaner would

have carried 30,000 coverages of accelerated traffic without failure.

In all probability, the pavement built at Kelly, under any but the special and peculiar circumstances of the test, would have demonstrated a capacity to serve the requirements of our heaviest bombers without distress during the normal life-expectancy of the pavement.

One thing the aborted Kelly test did demonstrate: Base and sub-base for flexible pavement can be built by normal contract procedures that will withstand accelerated traffic of these heavy wheel loads, and perform to the complete satisfaction of the most exacting engineer. In the confused accounts of the Kelly episode this is a fact that has been obscured.

● *New Test Conditions.* Since the Kelly test, The Asphalt Institute has learned that new test loading conditions have been established which are not only totally without precedent but far exceed the limits of present engineering knowledge. The Corps of Engineers have embarked upon a program of testing pavements under 30,000 coverages of test loads of 325,000 lb. on twin tandem gear (81,250 lb. per tire) at tire pressures of 325 psi, and at pavement temperatures not lower than 90°F.

These wheel assembly test loads are approximately three times those of the B-47 bomber. They are far in excess of landing gear loads of any civil air transport, propeller or jet, existing or contemplated.

Designing any type of pavement to meet these test loads is an extrapolation into the unknown which

can be established only through research. Knowledge must be gained through continued testing. Yet, testing by the Corps of Engineers has been suspended because no further funds have been allocated by the Air Force.

The Asphalt Institute believes this is a problem of vital concern to the national defense and the national economy. It feels that adequate research funds should be allocated from the defense budget if we earnestly hope to preserve properly engineered construction for our military establishment. With \$43 billion of a proposed \$72 billion national budget earmarked for the Department of Defense, the lion's share of which will be expended for air defense, it seems reasonable to expect a modest appropriation for continued airfield pavement research.

The Institute will, of course, continue its own research in this direction. Meanwhile, however, if there is any construction method which has proved it can meet these new test conditions, the Institute wishes to propose this interim solution:

The pavement distress under these increased test loads occurs exclusively in a narrow track along the centerline of the runways and taxiways. Consequently, as an *interim solution*, it is suggested that the Corps of Engineers and the Air Force confine to the ends and center strips of its runways and taxiways whatever special construction may be required to handle this unprecedented channelized traffic. It is further suggested that the remainder of the runways and taxiways continue to be constructed of asphalt pavements because of their proven adequacy and economy.

This, we repeat, is offered as an interim construction policy in a period of accelerated transition, both in aircraft and pavement design.

It is pertinent to point out that seven of our ten busiest civilian airports are served by asphalt pavements. Nor does Commissioner James T. Pyle of the Civil Aeronautics Administration anticipate any need to make drastic changes in pavement design to accommodate tomorrow's jet transports. He has expressed the conviction that today's runway pavements, with some extensions where indicated, will be adequate for the transports now in design stage.

● *The False Analogy.* The Asphalt Institute is seriously disturbed by
(Continued on page 156)



● Multiple pipe arch bridge, costing one-third less than a conventional bridge, was built to replace a dilapidated wooden structure near Mill Village, Pa.

16 Pipe Arches Replaced Odd Trestle

Waterway area equal to that of old bridge obtained in structure built at saving in cost.

AN unconventional "pipe arch" bridge, constructed like a dike with a succession of huge drainage culverts to carry water through its base, is proving to be a practical and economical structure for spanning small rivers and streams.

The design is basically the familiar road culvert—16 culverts laid side-by-side across a watercourse. The culverts serve a double purpose: channeling the waterflow and supporting the earth fill on which the roadway is built.

For a successful example of such a structure, Republic Steel Corporation points to rural Mill Village, in Pennsylvania, where is corrugated steel sectional plate pipe arches were used in one of the first multiple pipe arch bridges in the East. According to Pennsylvania highway department engineers, the sectional plate pipe arch bridge here pictured has already weathered two of the state's worst successive flood seasons since its opening in 1954.

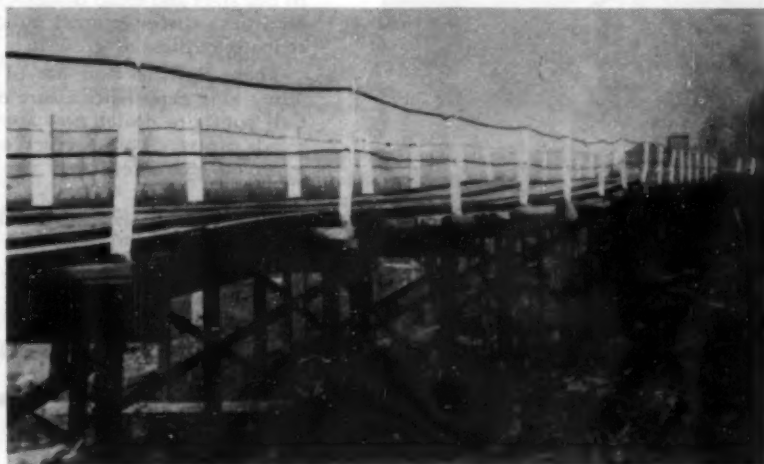
The cost of the pipe arch bridge was only \$87,000. Estimates for any type of open bridge were at a minimum of \$125,000. According to the

engineer, the economy is due to simple design; easy construction; and elimination of foundation work, pilings and abutments.

For each of the structure's 16 arches, sections were bolted together to form culvert lines 54 ft. long. These

were laid parallel 4 ft. apart in the path followed by flood waters. Back-fill between the arches was thoroughly compacted. Sloping concrete walls were installed to protect the embankments. Asphalt surfacing completed the project.

Nearly a thousand pieces of sectional plate were supplied by Republic Steel. For simple and quick assembly, plates were provided with bolt holes and marked according to assembly



● Before replacement with a modern pipe arch bridge, this dilapidated wooden structure spanned an area of low-lying meadow flooded each year by overflow waters of French Creek, near Mill Village, Pa.

instructions. The pre-formed sections were nested for ease of handling and transporting. End sections were pre-cut by Republic Steel to make the structure conform to the natural slope of the backfill. This provided savings in the length of individual structures. The sloping concrete headwalls were poured without the use of forms.

The pipe arch bridge replaced an outdated wooden structure 200 ft. long. Each of its arches has a span of 13' 4" and a rise of 8' 5". These give the bridge a total waterway area equal to that of the structure it replaced.

The contractor for the job was the W. L. Dunn Construction Co., of Cochran, Pa., which firm completed the job in one-third the time that would have been required for an open bridge.

FLEXIBLE PAVEMENTS

(Continued from page 154)

the misleading interpretation being assigned to the abortive and unrealistic pavement test at Kelly AFB. The erroneous conclusions are being applied, frequently in all innocence, to highway construction.

Even if it were a valid test, which it was not, the Kelly AFB test could not yield data that would apply to highway paving needs. The extreme range of tire loads rules out even the remotest relationship. The maximum legal tire load permitted on our highways lies within the 5,000 lb.-6,000 lb. range. The Kelly test used a 50,000 lb. tire load.

Further, highway truck tire pressures average 70 psi; aircraft tire pressures used in the Kelly test were 200 psi.

In the last ten years the technology of asphalt paving has made tremendous strides. Whether a flexible pavement can be designed and built to meet the almost incredible test loadings recently introduced at Vicksburg (325,000 lbs. at 325 psi, etc.) is a question that only time and patient research can answer. Whether any construction can pass the test is an interesting matter for conjecture.

Army Engineers Develop Crevasse Detector

Army engineers have developed a device that locates crevasses . . . camouflaged Arctic "canyons" with

enormous appetites for men, equipment and supplies.

Developed by the Engineer Research and Development Laboratories, Fort Belvoir, Virginia, and the Southwest Research Institute of San Antonio, Texas, the unit creates a low frequency electromagnetic field which is distorted by the presence of a crevasse.

Basically, the device consists of four "electrodes" placed at approximately 20-ft. intervals. Its workhorse is a Weasel, an over-snow vehicle that carries special electronic equipment, moves three electrodes in the form of disk-shaped sleds about four square feet in size, and acts as an electrode itself.

The search-head is pushed ahead of the Weasel. The other sleds are towed behind. The rearmost sleds combine to create the electromagnetic field. Power is provided by a generator carried on the sled initially behind the vehicle.

For practical application, multiple electrodes are provided to produce alternate configurations for optimum detection over varying snow conditions and crevasses. Provisions are also made to power the electrodes from the vehicle.

More GIANT Sizes! More GIANT Tread Designs! More GIANT Savings! Now at SOUTHERN TIRE COMPANY!



Probably more dirt and rock is hauled on Southern Tire retreads than on any other retreaded tires. That's because more and more contractors and heavy equipment operators are discovering the superior quality and economy of Southern Tire retreads.

Southern Tire offers not only the country's most complete range of tire sizes and tread designs, but also the world's finest retreading facilities—three-sectional molds that mean no buffing to breaker strips regardless of growth.

These facilities and use of finest tread rubber, plus Southern Tire's long experience, assure better quality with greater economy. Call your tire dealer now for facts about how Southern Tire retreads can save you as much as 40% of the price of new tires yet give you guaranteed new tire service.

• All sizes—from 1100 x 24 to 33.5 x 33



SOUTHERN TIRE COMPANY

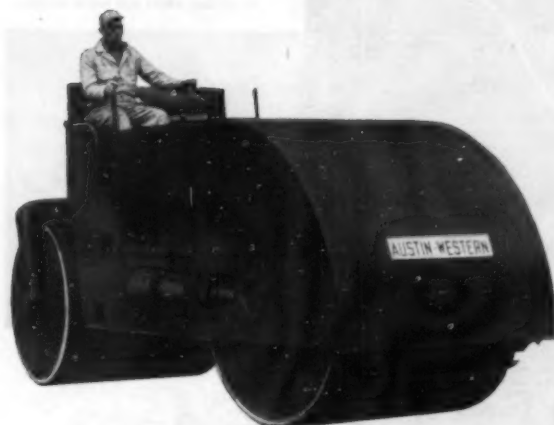
1414 Broadway
SHEFFIELD, ALA.

Phone Collect
EV 3-2312



THE A-W 3-WHEEL ROLLER

8-11, 10-12, 12-14 ton models. The left drive roll is keyed to the axle shaft; the right turns on heavy duty bushings independent of the left roll and axle. Torque-proportioning-type differential transfers power automatically from a slipping roll to the opposite one, giving traction under almost any conditions.



THE A-W TANDEM ROLLER

5-8, 8-12, 10-14 ton models. Full-width seat and dual controls are standard on all models. Forward and reverse levers are located at each side of the platform, steering lever at center, thus permitting the operator to sit where visibility is best.

Austin-Western also builds a 3½-6 ton
Portable Tandem Roller

AUSTIN-WESTERN ROAD ROLLERS

...Engineered for precision operation from power unit to final drive

This new series by America's pioneer manufacturer of motor rollers features smooth, flowing power, carefully balanced weight, and finger-tip hydraulic steering. These advantages mean increased maneuverability and faster, more efficient compaction.

All A-W rollers are powered by your choice of gasoline or diesel engines with 4-speed (regular) or 2-speed (optional) transmissions. Torque converter drives are available. The drum-type front and rear rolls permit sand and water ballast variations in weight up to 4 tons. Here are some typical design and construction features:

- Oversize axles and antifriction bearings for longer life.

- All transmission gears are machine cut and heat treated
- Entire transmission is equipped with antifriction bearings
- 3-wheel rollers have heat-treated alloy steel bull pinions and high strength steel bull gears
- Tandem rollers have machine-cut, heat treated final drive bevel gears and pinions
- Outside edges of finished rolls are beveled to prevent marks in hot materials

More than 75% of all parts of the 3-wheel and tandem rollers are interchangeable—an important advantage for the man who owns both kinds. See your nearby Austin-Western distributor. Or write us for complete information.

Power Graders • Motor Sweepers • Road Rollers • Hydraulic Cranes



AUSTIN-WESTERN WORKS

BALDWIN-LIMA-HAMILTON

Construction Equipment Division

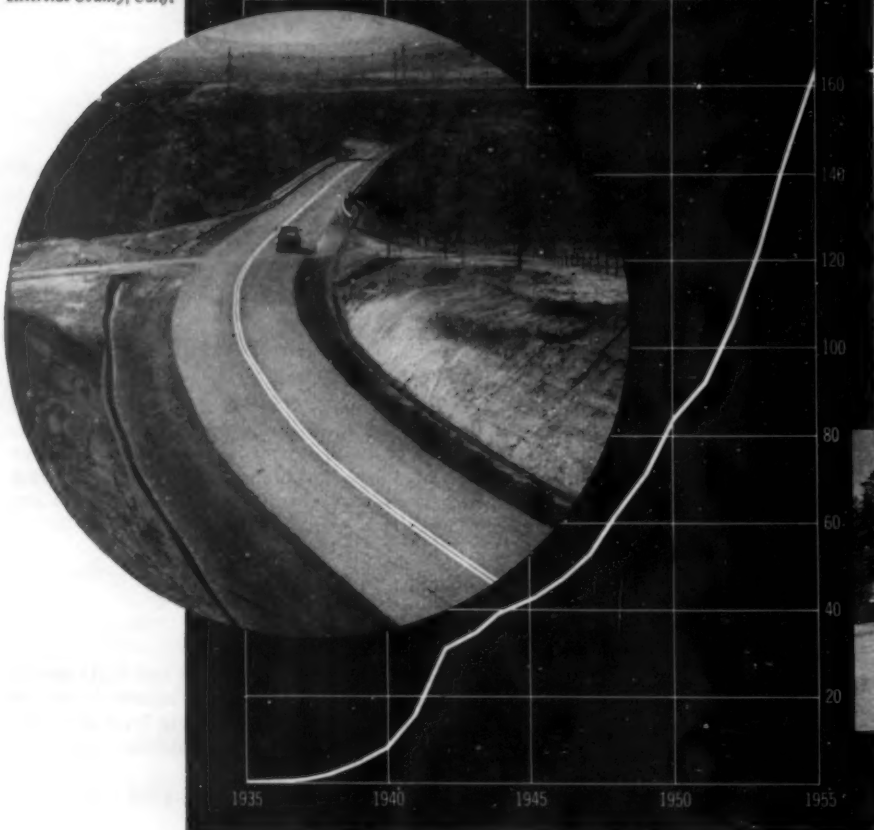
OTHER DIVISIONS: Eddystone • Lima •
Electronics & Instrumentation • Hamilton •
Loewy-Hydropress • Standard Steel Works
• Madsen • Polton

AURORA, ILLINOIS, U.S.A.

... for more details circle 207, page 16

ROADS AND STREETS, April, 1957

Recent soil-cement road,
Riverside County, Calif.



America's first scientifically-
controlled soil-cement road. Rt. 41,
near Johnsonville, S. C. Built in
1935, this photo was taken in 1955.



Growing Popularity of **SOIL-CEMENT** is based on 20-year success story

The graph shows the sensational growth of soil-cement pavement* since 1935, when scientifically-controlled soil-cement was first introduced. Note that by the end of 1955, 161,155,325 sq. yd. had been placed in the United States, Alaska and Canada. This 20-year success story is due to these important advantages:

SOIL-CEMENT IS ECONOMICAL. About 85% of the required material is usually available on or near the site. This saves both material and transportation costs.

SOIL-CEMENT CONSTRUCTION IS FAST. Crews quickly learn the simple construction techniques and have built as much as a mile and more of pavement in a single day.

SOIL-CEMENT IS DURABLE. Soil-cement has proved its durability in all climates. Nearly all the soil-cement pavement ever built is still in service—usually carrying heavier traffic than it was designed for.

SOIL-CEMENT MAINTENANCE COSTS ARE LOW. Maintenance records demonstrate the extremely low cost of keeping soil-cement pavement in good repair.

For more information about economical, durable soil-cement pavement write today for free, illustrated literature. Distributed only in the U.S. and Canada.

*Soil-cement pavement consists of soil-cement base and bituminous surface.

PORTLAND CEMENT ASSOCIATION Dept. A4-28, 33 West Grand Avenue, Chicago 10, Illinois
A national organization to improve and extend the uses of portland cement and concrete through scientific research and engineering field work

... for more details circle 283, page 16

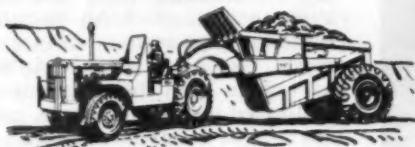
ROADS AND STREETS, April, 1957

The Right Size and Type Rear Dump

for every tough off-highway job!



34-ton capacity PR21 - DW21, for maneuverability in tight quarters.



PR15 - DW15 — fastest, toughest hauler in the 22-ton capacity class.



34-ton capacity PR20 - DW20, for long hauls, high speeds.



New 31-ton Athey Hydraulic Ejection Trailer handles sticky, hard-to-discharge materials.



Name the materials you handle — Rock or earth — there's an Athey Trailer designed specifically for handling them faster and cheaper than ever before.

Name the tough jobs that beat up haulers — Fast, tough hauls, sloppy footing, big rock, tight quarters — that's the job for an Athey Trailer!

You make your selections from the only *complete* and *proved* trailer line. Select the exact size and features to gear your haul unit to your job. You can depend on them — each Athey Trailer is built to highest standards of quality, design and construction. And Athey Trailers set the pace for lower cost, fast dumping, greater maneuverability, easier loading and higher production.

Ask your Athey-Caterpillar Dealer for all the facts on the complete line of quality-built Athey products today — he will gladly help you select exactly the right Athey-Caterpillar hauling unit for your off-highway job. Or write us for literature. ATHEY PRODUCTS CORPORATION, 5631 West 65th Street, Chicago 38, Ill.



THE *Complete* TRAILER LINE... *by the Leader*

... for more details circle 206, page 16

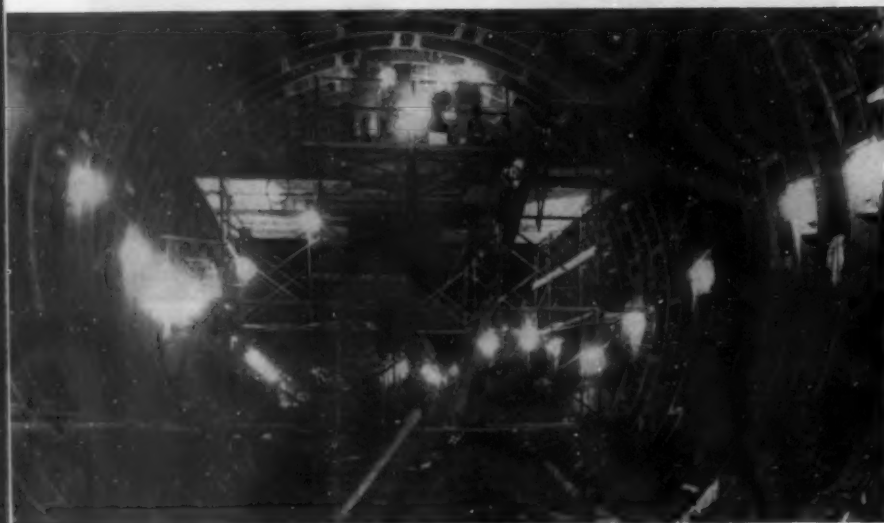
ROADS AND STREETS, April, 1957



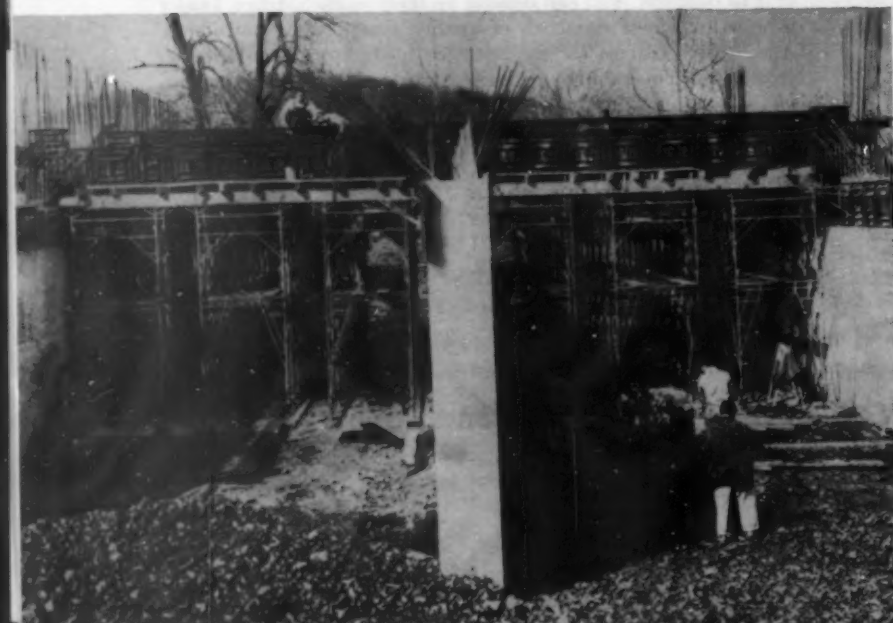
● New York State Thruway underpass project aided by steel scaffolding.

Familiar Scaffolding Doing Many Highway Jobs

Once used mainly for buildings—now a time and money saver for structures required in road and street work.



● Lincoln Tunnel third tube caulking performed atop rolling steel scaffolds.



Over the past ten years, almost everywhere one looked there would be steel scaffolding providing fast, efficient working platforms for every conceivable kind of building construction, from structural steel on through finish painting. Building maintenance, cornice removal, repair and demolition, too, have been seen being effectively performed with this versatile, modern method of supporting men and materials with ease and safety.

Today steel scaffolding is used also in the construction of dams, roads, bridges, tunnels, refineries and other "big jobs." Taking a page from the building contractors' and engineers' handbook, heavy construction engineers found that the same principles of engineering could simplify construction procedure. Their use of steel scaffolding has increased rapidly during the past decade. Steel scaffolding often speeds up completion dates, saves time and money, and promotes greater safety. For example:

1. Construction of the many bridges on the New York State Thruway received an "assist" from steel scaffolding. Prefabricated Patent "Trouble Saver" sectional scaffolding was designed to provide easy access for the construction of pier columns for an overpass. The scaffolding supported vibrating equipment and workers, and helped in the erection of form-work for above-ground sections of

● Bridge shoring costs were cut 25% for Mal-Bros. Co. with steel scaffolding.

pier shells. As shown here, men and materials for Carlo Bianchi, contractor, were able to move about quickly via firm, level platforms.

2. Another example of bridge building speeded with steel scaffolding was the job to relocate a street in Scotch Plains, N. J., where an overpass bridge was required. To reduce the necessary concrete shoring operations and costs, the contractor, the Mal-Bros. Co., decided to use steel shoring. As shown in the photograph, 272 frames were quickly assembled in 3' x 5' towers 1 ft. apart. Rows were spaced 2½ ft. apart to provide support forms for pouring the concrete deck. This shoring method with steel scaffolding cut the shoring costs for this bridge by 25%.

3. The contractors on the new Lincoln Tunnel tube found that steel scaffolding speeded up their work. In addition, the increased safety factor of steel, versus wood, was a consideration here. In the illustration, notice the workmen for Mason-Johnson-MacLean, general contractors, standing atop "Trouble Saver" sectional steel rolling scaffolds, caulking the new Lincoln tube under the Hudson. Once set up, these rolling scaffolds were moved rapidly right along with the work.

4. Steel scaffolding also aided in widening the Jersey approach to the Lincoln Tunnel. Grow Construction Co., general contractor, had the job of building a security wall above the rock face above the roadway. One photo shows how prefabricated sections of Patent steel scaffolding were fitted together with SlideLoks to form supporting platforms for men and materials.

5. On another section of this same job (also pictured), subcontractor Fred Wendel worked 50 ft. up under an overpass for installing drainage piping, working from sectional steel rolling and stationary scaffolds. Joined by trusses at the top, these scaffolds provide ample clearance for traffic below. Notice, too, the extra working levels provided by side brackets with plank staging, at right in the photo.

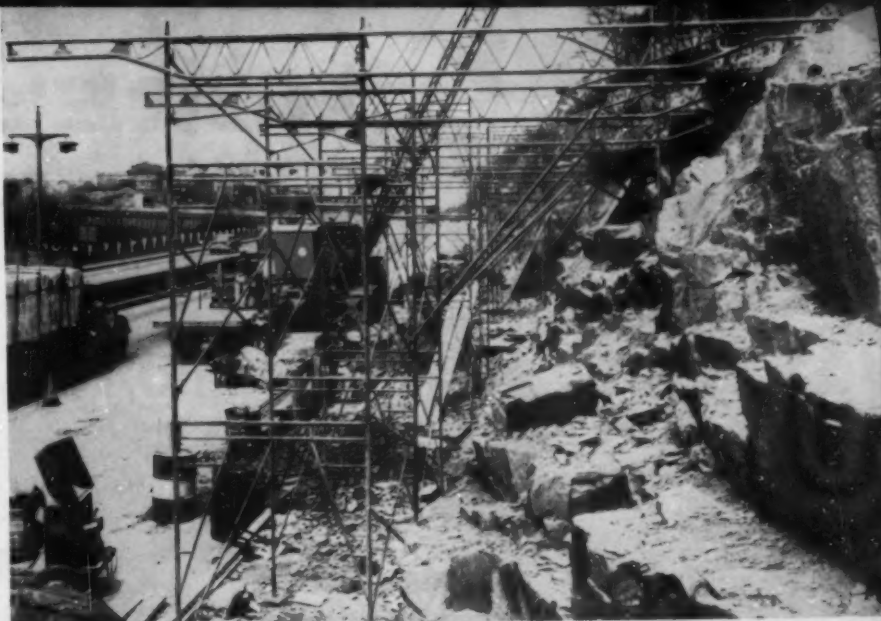
Soil-Cement Yardage Up 15% Over 1955

A total of 25,100,000 sq. yd. of soil-cement construction was awarded during 1956, according to the Portland Cement Association. This represents a 15% increase over 1955 awards. Street construction

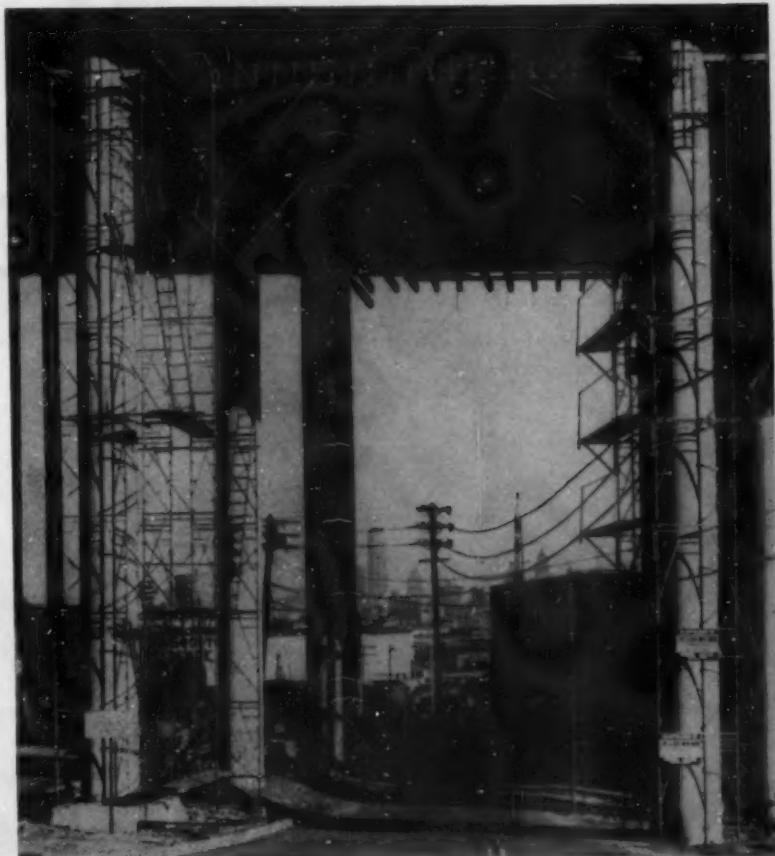
showed the largest increase, with more than 7,000,000 sq. yd. awarded, a gain of 34%.

The over-all yardage is the equivalent of 2,100 miles of 20 ft. pave-

ment, according to the PCA report. The greatest acceptance for this type has been for shoulders, subdivision streets, county roads and shopping center parking areas.



● Jersey roadway approach to the Lincoln Tunnel was flanked by rock cut. Rock was trimmed and parapet built with steel scaffolding.



● Piping subcontractor worked 50 ft. up under this overpass on the Lincoln Tunnel approach using steel scaffolding.

HERE'S *GO-power*



leveling fill



finishing between forms



cutting ditches



pushing scrapers



scarifying



backfilling



terracing



leveling land for subdivisions



working oil-mix



building road shoulders



bulldozing



spreading base



advertisement

graders give you more **GO-power**



With an Adams grader your operator can match speed to load, apply more power to hard cutting, travel fast job-to-job... get more work done in less time, at lowest cost! That's GO-power in action!

*Speed range of 150 hp Adams 660

MILES PER HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
3 creeper speeds (optional)	1																											
	2																											
	3																											
4 working speeds (standard)	1																											
	2																											
	3																											
	4																											
2 intermediate speeds (standard)	5																											
	6																											
2 travel speeds (standard)	7																											
	8																											
4 reverse speeds (standard)	1																											
	2																											
	3																											
	4																											

This chart shows speeds available in the "660". Models 550, 440, and 330 graders have similar 15-speed ranges. A smaller Adams 220 Model has 5 forward speeds and 1 reverse, with 4 additional creeper speeds optional. The big 190 hp POWER-Flow[†] Adams 660, with torque-converter, has effective work-power of infinite gear ratios — forward 0.0 to 27.4 mph, reverse 0.0 to 24.4 mph.

This wide range of reverse speeds gives you fast back-up for one-way work cycles. It naturally increases your grader production.

turn page for more on **GO-power**

that puts more money in **YOUR POCKET**

Adams 660 cuts sub-grade for R. B. Tyler Co., Jackson, Miss. ... takes big bite at 4.7 mph, in median strip of 4-lane U.S. 61, between Natchez and Washington.



GO-power: to spread heavier lifts on the fill ... cut deeper on ditch slopes ... travel faster between jobs ... back-up faster on shuttle passes ... get *more* work done, every hour of the day. The built-in *GO-power* of Adams† heavy-duty graders speeds job completion ... puts more money in your pocket.

J. D. Adams built the first leaning-wheel grader in 1885. He introduced the first Adams motor grader in 1928; and in 1954 the vast experience and facilities of the J. D. Adams Mfg. Co. were merged with the larger engineering and production capacities of LeTourneau-Westinghouse Company. Thus the Adams grader line, reflecting constant improvement

over nearly three-quarters of a century, gives you today's most modern motor graders. These carefully designed, ruggedly built machines deliver the *GO-power* you need to handle the bigger, faster grading assignments demanded by you today.

For *every* kind of work, Adams heavy-duty graders give your operator not just one, but *several* full-power speeds. With easy-acting controls, he selects gear-ratios that get most work done, with least effort, and with greatest speed. With Adams' wider range of power-speed combinations, you can do up to 25% *more blade-work* than with competitive graders of comparable power and weight.

†Trademark

turn page for more on **GO-power**

—more money in **YOUR POCKET** (cont'd.)

15 speeds* in Adams†

Adams heavy-duty graders have an 8-speed constant-mesh transmission (8 standard forward speeds and 4 reverse speeds). For wider work range, 3 creeper gears are available... making a total of 15 speeds... in Adams 150, 123, 104, and 80 hp graders.

You get up to 28% bonus blade-work

Adams graders do more work per day because they provide more working speeds at which maximum engine horsepower can be used. For example, on ditching and other heavy grading work, an Adams 550 takes a big cut, pushes a full blade of dirt, at 4.6 mph. Other 115-125 hp graders do not have this speed-power combination. When full power is required, they have to shift down to 3.6 to 4.0 mph. On jobs that require extra *GO-power*, the Adams produces up to 28% more work. This added production is **FREE**; Adams transmission costs no more.

27% extra production on shuttle grading

Most graders have only 2 reverse gears, with speeds to 7 mph. Adams has 4 reverse gears... 2 for blading and 2 for high-speed back-up. Many times your operator works a section too short to make turn-around worthwhile... so he backs-up. The Adams higher reverse speeds of 8 and 13 mph get the grader back to its starting point fast... convert otherwise wasted, reverse travel time to profitable production time.

Compare the Adams with some other grader having a top reverse speed of 6.3 mph. On a 400' forward operation, with each grader blading at 4.5 mph, the work takes 61 seconds. At 6.3 mph, the competitive machine backs-up in 43 seconds, while the Adams returns in 21 seconds. The Adams *saves 22 seconds* on each 400' cycle... has time to make 27% more cycles... does 27% more work.

Extra power... precise control

Adams optional creeper gears provide 3 operating speeds as low as 35' per min. with throttle wide open... and 22' per min. with engine speed cut-back. These slow speeds concentrate full engine power for scarifying old roadways and blading through sub-surface filled with stones and roots. Creepers eliminate the need for "slipping the clutch" at high RPM to get steady power at slow speed... reduce clutch wear and shock to machine. They also help you cut accurate finish grades, work and maneuver in close quarters.

Cuts non-productive travel time

Adams road speeds to 26 mph hold travel time to a minimum... give you at least 5 mph advantage over most competitive machines. Your Adams gets to the job sooner, and can work later. Just 10 minutes a day saved gives you *4 days* of bonus production in a year. And it's **FREE** with Adams' 8-speed transmission.

"660" smooths 90' wide haul-road at 6.7 mph, for D & M Excavating Co., Morgan, N.J. ... speeds haul and return of seven 25-yd. scrapers on million-yard dirtmoving job at Fresh Kills, Staten Island, N.Y.



†Trademark



advertisement

—more money in YOUR POCKET (cont'd.)

GO-power

Extra GO-power

New Adams POWER-Flow 660 gives you maximum push-power at all speeds, 0.0 to 27.4 mph. This extra heavy-duty grader applies 190 hp thru 3-to-1 torque-converter to give you the effective work-power of an infinite number of power-speed ratios. POWER-Flow 660 works thru varying loads at constant speed... will not stall... starts extra-heavy loads without lugging. Torque-converter cushions engine and drive against shock... makes operation simpler. Your best bet on heavy construction work.

Low-cost GO-power

60 hp Adams Model 220 works at 10 full-power speeds... leads its class with 5 forward, 1 reverse, 4 optional low-low creepers. Sturdy 4-wheel tandem-drive provides plenty of push-power for average grading and ditching. Machine cuts costs by releasing heavier graders for the bigger jobs... handles haul-road maintenance, fine grading, and scattered assignments at minimum cost. The low price, and low maintenance of this machine, make it a sound investment as the "second" grader on any equipment spread.



Scarifier

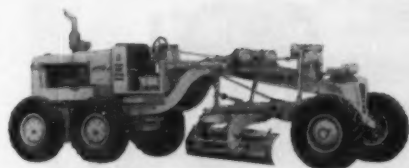
Available as optional equipment: strong, rigid V-type scarifier (straight-line type on Model 220) breaks up blacktop, hard-packed gravel roads, and other surfaces too tough for grader blade to cut. Blade can make full revolution without removing scarifier block.

Elegrader

Excavates and loads 400 to 800 yds. of loose materials per hour into trucks; sidecasts 700 to 1500 yds. per hour to elevate roadbeds. High-speed conveyor heaps 10-yd. trucks in a minute. Available for Adams 660, 610, 550, 440, and Caterpillar No. 12 motor graders.

WHAT'S YOUR PROBLEM?

in all 6 Adams[†] graders



POWER-Flow[†]

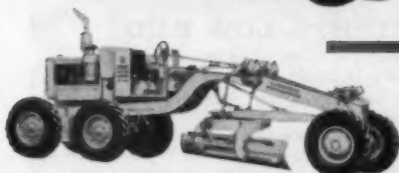
660*

190 hp diesel engine and torque-converter. Biggest, fastest grader in the Adams line. 30,200 lbs. **



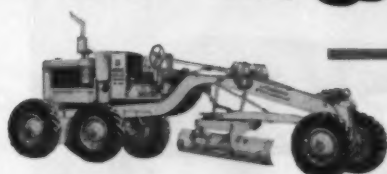
660*

An extra-heavy-duty machine with 150 hp diesel engine. 30,050 lbs. **



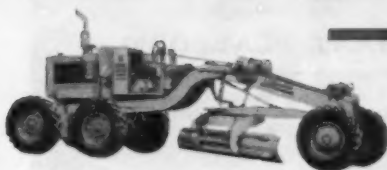
550*

Heavy-duty all-purpose tool, with 123 hp diesel engine. 26,320 lbs. **



440*

A sturdy, general-purpose grader in the 100 hp class. 24,080 lbs. **



330*

A high-speed worker in the 80 hp class. Diesel engine. 23,020 lbs. **



220

60 hp diesel, with hydraulic controls. Gives big-grader performance at low investment. 15,500 lbs. **

*Choice of Cummins or GM diesel engines.

**Weights shown are usual working weights.

Size for size, all Adams graders give you extra "muscle" and more "hustle". Rugged tandem drive...all-welded one-piece, high-arch wishbone frame...husky front-end...welded short-coupled blade mechanism...all combine to give you a sturdy structure for using Adams great push-power at top speeds.

ASK FOR A DEMONSTRATION. See for yourself how an Adams takes bigger, deeper cuts...pushes

heavier loads...moves dirt faster...moves job-to-job quicker...than competitive machines of similar size and power. Then consider how Adams *GO-power* will boost the output of your fleet...speed project completion...cut costs, and put money in your pocket. Your nearby LeTourneau-Westinghouse Distributor will be glad to arrange an Adams demonstration — *on your job*. Call him for all the facts and figures, or write us at the factory.

[†]Trademark AG-1426-G



LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

... for more details circle 263, page 16

WHAT'S YOUR PROBLEM?



for every **TOUGH** job,
there's a **TOUGHER** Dorsey

Buying a heavy-duty trailer by model number alone leaves room for error because manufacturers' standards vary widely. That's why we say, "Check the 'specs!'"

A Dorsey Model HTS-20 for example is substantially stronger than other "20-ton" low beds. You can prove this to your own satisfaction by comparing dimensions of main beams, cross members, and other structural members. The same applies to the rest of Dorsey's complete line, model for model.

"Standard equipment" should also be checked. All Dorsey models come ready for highway use under capacity loads, with full-size tires, lights, brakes, etc.

If you compare price, compare specifications, too, and you'll find you get more for your money with Dorseys.



For the complete facts on any model
heavy-duty trailer, see your
Dorsey Distributor — or wire collect:

DORSEY TRAILERS / ELBA, ALABAMA



MODEL HTS LOW BED

20 Ton capacity — Weights only 8,250 pounds
(also available in 15, 25, 30, and 35 ton capacities)

Although as much as a ton lighter than other trailers of comparable capacity, high-tensile steel main channels and close-spaced all-welded cross members give the HTS superior strength and ruggedness. Flat gooseneck provides support for blades and other loads.



THE GIANT PLATFORM

44,000 lb. capacity — Weight: 8,410 lbs.

In the year since its introduction, the Giant, with its 18-inch-deep main frame, has become America's No. 1 platform! Although as much as 2,000 lbs. lighter than other platforms, it has even greater strength.



NEW SELF-LOADING FLOAT

This trailer will actually carry 45,000 pounds concentrated in 10 feet of its length! The secret is the extra-deep high-tensile steel main frame that we "tailor" to length and load requirements.



TANDEM TILT-TO-LOAD

15,000 and 20,000 capacities,
Weights: 2,500 and 2,700 lbs.

Speed and efficiency as well as economy are combined in this versatile tilt model: it's so light a dump truck pulls it easily. Two-way hydraulic control is so precisely balanced the weight of a man will tilt it up or down. Single axle models also available.

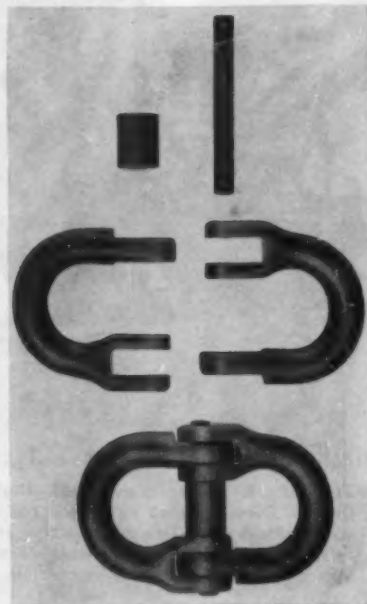
... for more details circle 228, page 16

ROADS AND STREETS, April, 1957

Job and Equipment Ideas



● Sling chain being attached to piling with Hammerlok coupling links, one of which can be seen where the chain joins the master link.



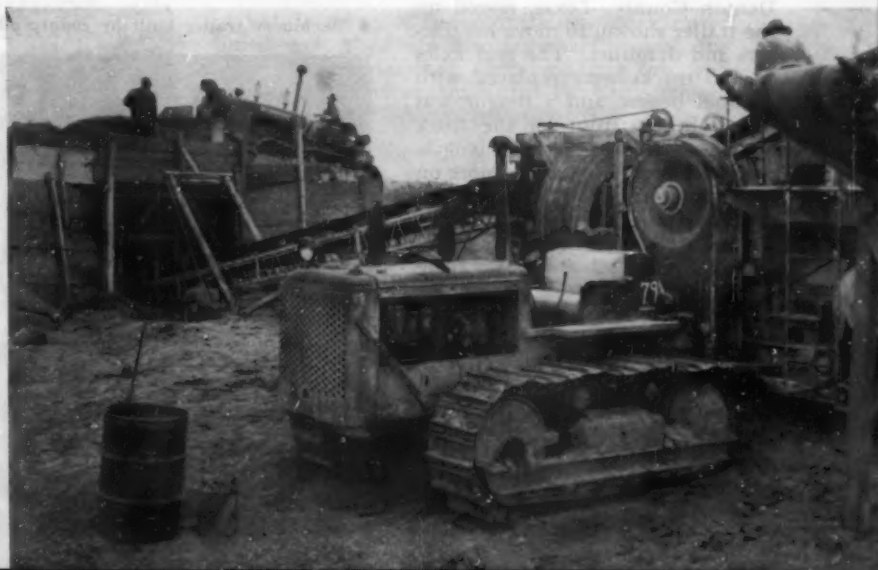
● Coupling link can be assembled in seconds with a hammer. No peening or welding required to make up alloy chain assembly.

New Chain Coupling Link Saves Time

The McLain Construction Corporation (and Horton Pile Driving Company), of Kenmore, New York, needed in a hurry a special high-strength alloy-chain assembly to remove the old wood piling at a building site. Two hours after calling their chain supplier, the assembly was at work removing piling. This fast service was made possible by a new coupling link that enables anybody who can drive a nail to assemble or rebuild a sling chain in minutes. The "do it yourself" alloy steel link, seen in the picture above, is called "Hammerlock."

Power Take-Off Drives Arizona Crushing Plant

Here is another example of the utilization of a tractor to drive crushing equipment. Pictured here is an International TD-18 tractor performing this role for Martin Construction Company of Tucson, Arizona. The crusher production was for a relocation job on U.S. 80 near Benson, Arizona, during 1956.



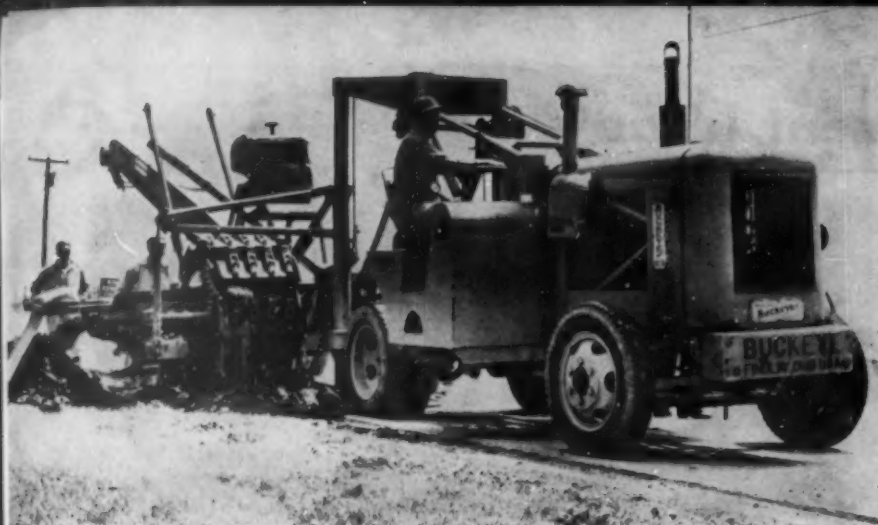
JOB AND EQUIPMENT

IDEAS—Continued

Test of Grader Operator

One of the tests of a good grader operator, according to Caterpillar Tractor Company is the ability to cut a straight ditch line. The operator should make sure that at least two ditch stakes can be seen at a time, so that he can line his work up accurately by eye. In starting the ditch, it is suggested that he take a light cut—only a few inches. This will make it easier to hold the machine straight and to follow the ditch stakes accurately.

For the first cut, put the blade in
(Continued on page 174)



Ditch for Shoulders with a Trencher—Why Not?

- Traveling 18 ft. per minute, this Buckeye trencher powered by a 3-71 Detroit Diesel engine excavates for a widening strip along Missouri state highway 54. Two 30-in. strips are being constructed on a 13-mile section of the highway between Mexico and Ladonna, Mo. Trinidad Asphalt Co. is contractor on the job.

Truck Tows Crane Unit Over the Highway

Along the Gulf Coast, the Texas highway department has equipped a rubber-tire-mounted clamshell crane with a trailer hitch, which can be connected to the back of a gravel truck, as shown. When a job is completed, the clamshell bucket is loaded into a truck and the crane's boom tip is connected, then away they go back to the yard.

When it is necessary to do a short gravel job, the truck can be just as easily connected and the crane dragged to the proper site. The wire cables are left strung up, with just enough slack in them to allow the bucket to be loaded. When time to go to work, the slack is taken up and the truck is already spotted for its first load of gravel.

Rugged Low-Boy Made With Old Truck Wheels

The county commissioner for Denton County, Texas, rigged up the trailer shown, to move his tractors and draglines. The rear axles of two trucks were replaced with channel beams, and a tongue was placed in the front for the truck hitch. A beam was then laid lengthwise in the center, and two more on each side were miter-welded near the front to make room for the front wheels to turn.

The skids which are shown lying on the channel irons across the trailer are pulled out so that one end rests on the ground, to make a ramp for a tractor or dragline to crawl on. The machine is then hauled sidewise, and it is just as easily unloaded.

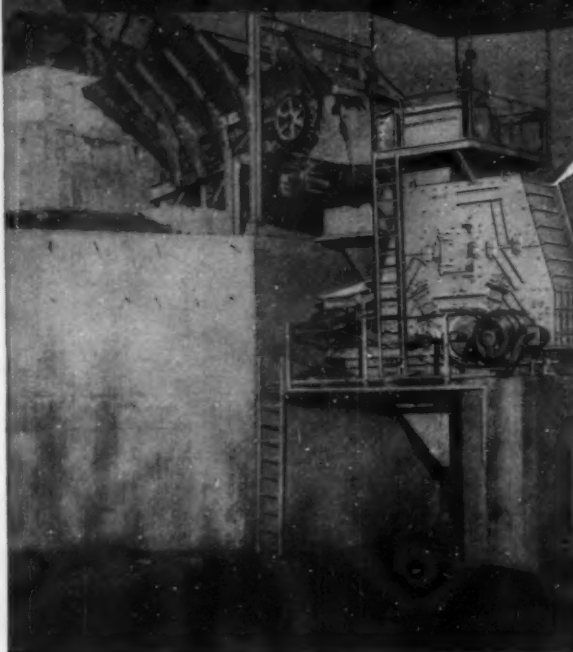


- One way to transport a rubber-tired crane.

- Machinery trailer built by county officials.



When You Bid These Highway Jobs . . . BE READY WITH CEDARAPIDS



(above) In hard limestone with 16% silica, this 4350H Double Impeller Impact Breaker produced 2400 tons per day, of which 1900 tons are 1" material or larger.

(right) Portable Double Impeller Impact Breaker eliminated dirt and soft stone to meet Kansas Turnpike specifications with 250 TPH production.



You get more specification aggregate from mixed, dirty and wet material with **CEDARAPIDS DOUBLE IMPELLER IMPACT BREAKERS**

With specifications getting tougher, and aggregate material often of questionable quality, more and more producers are turning to Cedarapids Double Impeller Impact Breakers. It's one of the most successful money-makers in difficult conditions for either portable or stationary applications. These efficient units are easily adjusted to produce a minimum of fines and crush, selectively, mixed hard and soft material to desired sizes. They work efficiently in wet and dirty material because it won't pack in the breaking chamber.

High ratio of reduction . . . up to 40 or 50 to 1 . . . produces big tonnages of specification aggregate in one pass. Maintenance is low since

the entire area of the breaking chamber is used for reduction by rock striking rock in suspension.

While many of these units are working in limestones, they are also successfully used for gravel, basalt, dolomite, sandstone, iron ore, lead ore, zinc ore and uranium ore. For the complete story, see your Cedarapids Dealer today.

OTHER CEDARAPIDS CRUSHING EQUIPMENT

The complete line of Cedarapids crushing equipment will handle practically any aggregate production problem in portable or stationary plants. Ask about Single or Twin Jaw Crushers, Roll Crushers, and Hammermills, available in a wide range of sizes. Also Horizontal Vibrating Screens, Conveyors, Vibrating Grizzlies, etc.



IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U. S. A.

. . . for more details circle 254, page 16
ROADS AND STREETS, April, 1957

"Phillips 66 Lubrication Engineers are Johnny-on-the-spot to keep our equipment fully productive"

—Lee McLean, Jr., President
McLean Construction Company
Springfield, Missouri



McLean equipment grading and widening new Commercial Street Trafficway in Springfield.



20,000 yards of earth were moved in grading and preparation of modern, new trafficway.

"WHENEVER WE'VE NEEDED HELP on knotty maintenance problems, Phillips 66 lubrication engineers have been prompt with valuable technical assistance," says Lee McLean, Jr. "We value this help so highly that, for the past three years, we have been an exclusive Phillips 66 customer."

McLean Construction Company specializes in earth moving, highway construction, plant site preparation and municipal work. It operates more than 60 pieces of equipment.

Phillips 66 lubrication engineers can help you with your maintenance problems, too. Phone, write or wire today and we'll have one of our division men on the way. Sales Department, Phillips Petroleum Company, Bartlesville, Okla.

PHILLIPS 66 HEAVY DUTY MOTOR OILS



Remember:
IT'S PERFORMANCE
THAT COUNTS!

... for more details circle 280, page 16
ROADS AND STREETS, April, 1957

Power-Transfer Differentials put

MORE PUSH in a PAYLOADER



more TRACTION means more PENETRATION

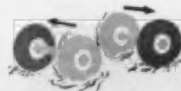
There's more punch—more push—more penetration with a "PAY-LOADER" because automatic power-transfer differentials assure better traction in adverse conditions—on loose underfooting, sand, mud, snow and ice. If one wheel slips, more power is automatically transferred to the opposite wheel, enabling a "PAYLOADER" to keep driving forward, where ordinary tractor-shovels spin helplessly. You get traction and *action* instead of wheel-spinning, time-and-power-wasting *inaction*.

These special, more-costly but more-effective differentials are but one of the many reasons why you get more tractor-shovel when you buy a "PAYLOADER" . . . why they dig more, carry more and deliver more yards per day than any comparable size tractor-shovel. You also get no-stop power-shift transmissions, planetary final drives, power-steer, 4-wheel power brakes, hydraulic load-shock-absorber . . . and you get the exclusive "PAYLOADER" bucket motion with 40° tip-back at ground level plus powerful pry-out action.

Your "PAYLOADER" Distributor is anxious to prove that a "PAY-LOADER" can out-perform anything in its class. He wants you to try one on *your* work and let *you* be the judge. Call him today!

Power-Transfer Differentials...

automatically direct the most power to the wheels that are gripping—whenever the other wheels tend to spin on mud, loose sand, ice, snow, etc.



THE FRANK G. HOUGH CO.

768 Sunnyside Ave., Libertyville, Ill.

Send full data on 4-wheel-drive "PAYLOADER" units.

<input type="checkbox"/> Model HO	<input type="checkbox"/> Model HH	<input type="checkbox"/> Model HU
2½ yd. payload	1½ yd. payload	1½ yd. payload
1¾ yd. struck	1½ yd. struck	1 yd. struck

Name _____

Title _____

Company _____

Street _____

City _____

State _____

65



PAYLOADER®

MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.

SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

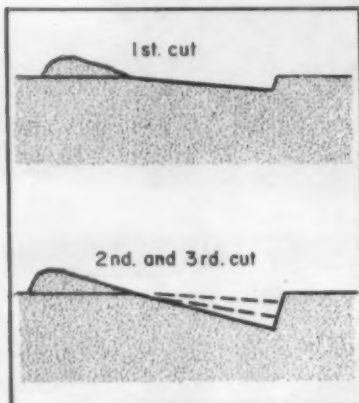


... for more details circle 247, page 16

JOB AND EQUIPMENT IDEAS—Continued

(Continued from page 170)

so-called ditching position and cut several inches from the stake line. The windrows should fall just inside the rear wheels and the front



- First cut for a ditch along the road. Second and third cuts to continue the ditch operation.

wheels should be kept leaning in a direction in which the material is being cast.

After the first cut has been made and a straight ditch line established, the blade angle is opened to cut the stake line. All subsequent cuts should be made deep enough to utilize the full capacity of the grader in second gear.



- One of three 1956-season setups of Century Construction Co., using a Noble rubber-tired batch plant and two stationary-type mixers.

Blade setting remains the same for these cuts as for the first pass, except the tow is lowered for deeper cutting. After two full heavy cuts, it will be necessary to move the windrow from the shoulder line.

Mobile Batch Plant

A batching plant on wheels saved erecting and dismantling a stationary plant three times on a 40-mile highway widening job, according to Henry A. Howell of Century Construction Company of Des Moines, Iowa. 40,000 cu. yd. of concrete was supplied by a Noble-Mobile plant for constructing 3-ft. strips on both sides of U.S. 61 be-

tween Grand View and Fort Madison, Iowa.

Two stationary-type mixers supplied pre-mix to dump trucks for the short haul to the pouring. The plant required no concrete foundations or field wiring.

Weed Protection Formula

A new formula has been evolved for protection against weed growth under exterior paving or surfacing. After proper leveling and compacting of the earth in the area, the soil is sprayed under uniform pressure with a sodium arsenite solution.

Manufacturer of the sodium arsenite used in this formula is Chipman Chemical Co., Inc.

Old Median Curb Removed With Skid-Shovel Unit

McKay Construction Company, Chicago, used its International Drott TD-9 Skid-Shovel to good advantage to help eliminate a bottleneck on North Ave. (Route 64), just west of the city. A concrete curb that bordered an 8-ft. earth median strip was broken up and the fragments loaded into a truck by the machine.

The previous arrangement of the strip and the four-lane roadway presented a traffic hazard. The engineer's answer was to design a low landscaped median strip and an additional 15-ft. lane on each side, to permit three lanes in each direction. Turnouts were also added to permit vehicles to turn left without obstructing through traffic.

- Drott TD-9 Skid-Shovel being used to eliminate bottleneck.



AGC SAFETY RECORD

(Continued from page 123)

Midland Construction Co., Midland, Mich., second place, and Mott Construction Co., Centerville, Iowa, third place. (Heavy) Brunn Construction Co., Kansas City, second place, and C. W. Vollmer and Co., Inc., Houston, third place.

Ten-Year Record — (Highway) Burrell Construction and Supply Co., New Kensington, Pa., second place, and The O'Neil Construction Co., Havre, Mont., third place. (Heavy) The Holmes Construction Co., Wooster, Ohio, second place and the Fluor Corporation, Ltd., Los Angeles, third place.

Chapters. The Kansas Contractors Association, Inc., second place, and the AGC of Illinois, third place, each with over 100 members.

More Contractors Each Year Join Accident Prevention Campaign

- Harry Kirk's program as AGC's safety director made a slow beginning but has really snowballed—participating companies doubled in past three years, up 23% in 1956.
- Today 3,260 of the 6,800 AGC companies have reported their accidents and are participating in the campaign.
- Number of accidents per million man-hours by reporting companies dropped 18%—while general industry average has continued upward.
- Number of AGC chapters now "100%" in campaign—up sharply and continued gain in prospect.
- As a result, individual companies and chapters have, in numerous cases, enjoyed a constantly lowered compensation rate and reduction in other job costs, aside from prevention of much human misery.

HOW IS YOUR COMPANY DOING?

Predicts \$200 Million Needed for Photogrammetry Work

ASCE Speaker Urges Large-Scale Research

Photogrammetry, the applied science of using photographs for making physical measurements, will find its major impetus to research and development, as related to civil engineering, in the Federal aid highway program." So predicted Prof. Charles L. Miller, of Massachusetts Institute of Technology, speaking at the recent convention of the American Society of Civil Engineers at Jackson, Miss.

"The highway program in turn will have a great impact on photogrammetry," said Prof. Miller. "Although most research and development in photogrammetry has previously been conducted by or sponsored by the military and national mapping agencies of the federal government, the magnitude and importance of the highway program justifies a sizable research program in photogrammetry as directly related to highways, both at the national level and by individual states.

"Estimates of the expenditures by highway departments for photogrammetric services for the next ten years indicate an order of magnitude of \$200,000,000. It could easily reach twice this amount. Due to the

dynamic nature of photogrammetry and the tremendous potential for technological advancements, an expenditure the equivalent of five percent of this amount for research and development in photogrammetry is entirely reasonable. Therefore, we should be thinking in terms of a collective research expenditure of \$10,000,000 or \$1,000,000 a year during the next decade. Although this sounds like a lot of money, it is only approximately one-thirtieth of one percent of the Federal highway expenditures alone.

"Cooperative research by highway departments, photogrammetric firms and engineering schools should be developed. Participation by the engineering schools should be strongly encouraged. Sponsoring photogrammetric research in the engineering schools will serve the double purpose of (1) making effective utilization of the research experience and facilities of the schools and (2) encouraging the strengthening of the education programs in photogrammetry at the graduate level. It is felt that the latter purpose is of most importance. The future of photogram-

metry and its potential contribution to civil and highway engineering depends almost entirely on the number, caliber, and educational background of the young engineers who choose to enter the field."

ARBA in Photogrammetry

A technical committee that will serve as a clearing house for information on photogrammetry has been established by ARBA. William C. Cude, chief of the Army Topographic Engineering Department, Engineer Research and Development Laboratories, Fort Belvoir, Va., and National President of the American Society of Photogrammetry, is chairman.



William C. Cude



B-60 SERIES—All-around workhorses for construction jobs everywhere. B-60 four- and six-wheel chassis are available for dumpers, concrete mixers, equipment hauling tractors, and flat-bed trucks... powered with Mack Thermodyne® gasoline or diesel engines in the 170 or 205 horsepower range.



B-80 SERIES—Largest and most powerful highway and off-highway chassis in the Mack line. B-80 tractors for heavy carry-all trailers and B-80 truck chassis for mixers and dumpers are available in four- or six-wheel models... powered with 170 to 205 hp Mack Thermodyne gasoline or diesel engines, or stock diesels in the 250 to 300 horsepower class.



B-40 SERIES—Widely popular for maneuverability and rugged strength. B-40 four- or six-wheel dumpers, mixers, flat-bed trucks and tractors are especially valued for their bonus capacities, economy, and handling ease. Powered by Mack 150 hp Thermodyne diesel or Magnadyne gasoline engines.

Most in demand... for the most demanding jobs

For dump, mixer, or flat-bed truck service in highway and off-highway hauling, Mack large-capacity trucks and tractors will do your toughest, most demanding jobs more efficiently, more economically, and more profitably. More, Mack offers you the widest selection of heavy-duty units with gross vehicle weights ranging from 25,000 to 65,000 lbs. and tractors for carry-all trailer service up to 175,000 lbs. G.C.W.

Have your local Mack representative give you complete details and specifications. Mack Trucks, Inc., Plainfield, New Jersey.
In Canada: Mack Trucks of Canada, Ltd.

MACK
first name for
TRUCKS

4839

... for more details circle 270, page 16

ROADS AND STREETS, April, 1957



PETTIBONE WOOD P-600 PULVERIZER

*...reclaims old asphaltic roads,
streets and shoulders with
savings up to \$3,000 per mile!*

**SCABIFYING AND
PULVERIZING ASPHALT**

Beat-up asphalt highways, streets and shoulders are now being rebuilt at less cost and for longer life by salvaging the asphaltic materials already in place and mixing them with cement or asphalt for the base course.

For the first time, an economical way of salvaging existing asphaltic materials is provided by the Pettibone Wood P-600 Pulverizer. This unique machine scarifies, pulverizes

and prepares old mats for 100% re-use, all in one operation. Even the oil is retained!

Laying down heavy-bearing, longer lasting bases virtually impervious to moisture from this salvaged material saves up to \$3,000 per mile for new materials, *plus* trucking charges on both the old and the new material.

Check into the P-600 Pulverizer story today. Write for convincing case history data.

Solve Your In-Place Breaking and Crushing Problems with the Cost-Cutting PETTIBONE WOOD PULVERIZER

PETTIBONE WOOD Heavy Duty PULVERIZER

*... crushes in-place rock as
big as this to the desired size*



The need for a modest-priced machine to crush rock and break hard material *in place* during the construction of County-Secondary and Farm-to-Market roads is fulfilled by the Pettibone Wood Heavy Duty Pulverizer.

With capacities up to 300 to 400 tons per hour, this husky machine is successfully used in gravel pits, too.

The Heavy Duty Pulverizer is another outstanding money-saving machine in the world's most complete line of mix-in-place and material preparation equipment.

Write for complete details today!

**Guaranteed to break or crush any material used
on highways... capacity to 300 to 400 tons/hr.**

PETTIBONE WOOD MFG. CO.

Originators of Mix-in-Place Roadbuilding Equipment

6900 Tujunga Avenue, P.O. Box 620, Stanley 7-3281

North Hollywood, California

Subsidiary of PETTIBONE MULLIKEN CORP., CHICAGO 51, ILLINOIS

... for more details circle 330, page 16

ROADS AND STREETS, April, 1957

177

What's New In Equipment and Material

Reader Service Coupon on Page 16.

Tractor Drilling Rig

Worthington Corp. has announced the availability of its new Blue Brute tractor-mounted drilling rig for production blast hole drilling on rock excavation projects, quarrying, ditching and open-pit mining. The Blue Brute drilling rig is a self-contained unit carrying its own air supply and driven either by the tractor engine or a cross-mounted portable.

The two hydraulically controlled jibs can be operated through a total arc of 100 degrees vertically or horizontally. The boom can be extended for any distance up to five feet providing a large drilling area and making it possible for more blast holes to be drilled from one location. Special features include the standard Blue Brute UM-40 chain feed and drifter assembly for fast drilling, low air consumption and economical performance; exclusive positive, long-wearing, oversize hydraulically-operated clutch between compressor and tractor PTO; and simple, positive-locking hydraulic controls to maintain position of drill.



Worthington Drilling Rig

For more information circle 120 on Service Coupon Page 16 and mail now

Tree Stump Remover

The Exeter Co. of Bloomfield, New Jersey, has introduced its "Stump Hewer," a new machine which is said to attack problems of stump removal and stump disposal by quickly grinding the tree stump down to as much as 14 inches below ground level. The depression can be covered with earth and the wood chips, with the shavings produced by the cutting action easily disposed of or used as mulch in the surrounding grass areas.

The new machine consists of a cutting head fitted with heat treated tool steel blades swinging on an adjustable arm fixed to a center post. The head is operated by an electric motor powered by a generator. The entire unit is mounted on a mobile, pneumatic tired trailer which can be towed at full road speeds by auto or truck. Wheel

barrow-type handles guide the cutting head into the stump and can be swung through an 8-ft. radius without moving the trailer. The head is adjustable to cut from 12 inches above to 14 inches below grade.



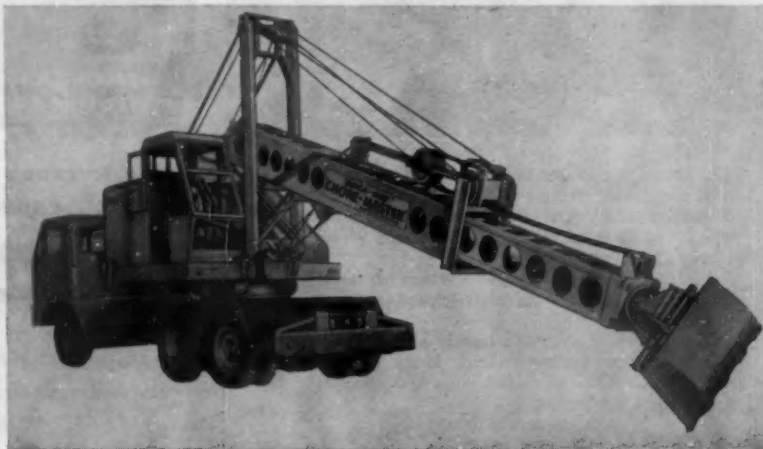
Exeter Stump Remover

For more information circle 121 on Service Coupon Page 16 and mail now

Digging Attachment

The "Chore-Master," a new hydraulic reaching, grading, digging attachment for crane-shovels, has been introduced by the "Quick-Way" Truck Shovel Company, Denver, Colorado. The "Chore-Master" is a telescoping boom which mounts on a special gantry and is interchangeable with other standard attachments on "Quick-Way" cranes. The telescoping action is operated by a large hydraulic cylinder. A second hydraulic ram opens and closes the bucket with a wrist action. A hydraulic motor rotates the bucket 50 degrees in either direction on the end of the boom.

The hydraulic system includes a tank and a tandem pump which operates off the crane engine. Hydraulic hoses extend to the front of the machine where they attach to the hydraulic lines on the boom by couplings designed for rapid removal or installa-



"Quick-Way" Telescoping Boom

tion of the attachment. The telescoping boom extends to a radius of 33 feet with the bucket open or retracts to a radius of 21 feet. The boom can be raised to an angle of 45 degrees enabling it to grade slopes as high as 27 feet. Maximum digging depth is 13 feet.

For more information circle 122 on Service Coupon Page 16 and mail now

Brush and Weed Cutter

The Servis Equipment Co., 1000 Singleton Blvd., Dallas, Texas, announces a new mower designed for cutting grass and weeds on parkways, landing fields, etc. Known as the model SC-80, the mower is equipped with 3-V-Belt drives and a Servis standard gear box, will cut brush and weeds up to 9 in. in diameter.

Special advantages claimed for the mower include: one-piece tapered tongue adjustable for height by hand lever screw; alternate free swinging or rigid type for blades; alemite fittings easily accessible to all working parts. The mower can be offset to right of rear tractor wheel as much as 32 in.



Servis Mower

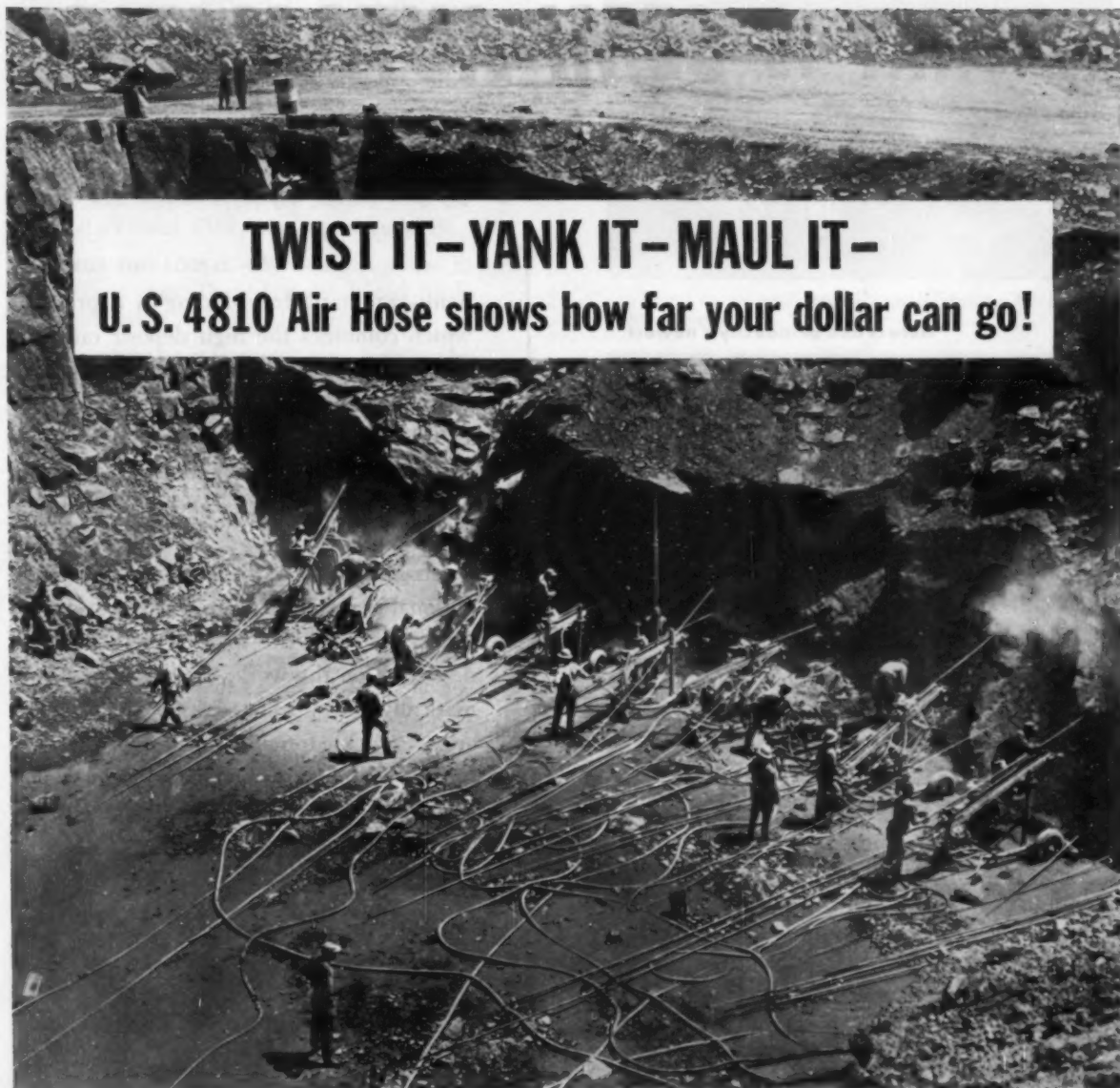
For more information circle 123 on Service Coupon Page 16 and mail now

Utility Rake Attachment

A new rake attachment for Arps (Continued on page 183)



AIR HOSE



TWIST IT—YANK IT—MAUL IT—
U. S. 4810 Air Hose shows how far your dollar can go!

This is the hose recommended for all pneumatic tools and air drills—for use wherever high working pressures, abrasion and general abuse would wreck an ordinary air hose.

Heavy tools can drop on it. Pieces of rock from blasting can strike it. It can be pulled over jagged stones, grinding gravel—in all kinds of weather. *Throughout all this, U. S. 4810 stays unharmed, delivers full service.*

U.S. 4810 combines super adhesion and extreme flexi-

bility. The rugged service that this hose provides throughout its long life proves that you are wasting dollars if cheaply constructed, short-lived air hose is being used instead of U. S. 4810 Air Hose.

A complete line of hose is obtainable at any of the 28 "U. S." District Sales Offices, at selected distributors, or by contacting us at Rockefeller Center, New York 20, N. Y. In Canada, Dominion Rubber Co., Ltd.



Mechanical Goods Division

United States Rubber

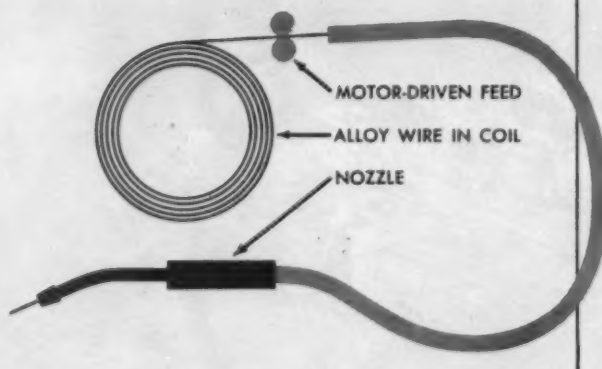
... for more details circle 312, page 16

ROADS AND STREETS, April, 1957

179

WHAT IS SEMI-AUTOMATIC HARD-FACING?

Here is one of industry's newest maintenance tools used to radically reduce hard-facing costs. It is simple, highly versatile and can be installed at moderate price.



Semi-automatic hard-facing is a process which combines the high deposit rates of automatic welding with the positioning and setup convenience of the manual method. It utilizes a complete series of Stoodly fabricated tubular wires containing alloys that meet all hard-facing requirements. These wires, supplied in layer wound coils, are mechanically fed to the nozzle by the semi-automatic welding machine. The welder merely directs the arc as the metal is deposited on the work, the machine automatically starting the wire feed when the arc is struck, stopping it when the arc is broken. Numerous advantages result when rebuilding and maintaining equipment in all types of heavy industry.



Repointer welded on with Stoodly Nickel Manganese and entire tooth hard-faced with Stoodly 121



Roll brought up to size with Stoodly Nickel Manganese and corrugations rebuilt with Stoodly 100

HIGH WELDING SPEEDS—Two to four times faster than the manual method at correct welding amperages, semi-automatic hard-facing effects enormous savings in time. Penetration of the base metal and dilution of the deposit are reduced, with lower heat input, all highly desirable features of this process.

FULL VISIBILITY—No submerging flux is required; the weldor enjoys complete visibility of the weld at all times. Flux dams are unnecessary.

NO STUB END LOSSES—Wires are supplied in continuous coils. There is no stub end waste nor time lost in changing electrodes.

SEMI-AUTOMATIC MACHINES—Now supplied by a number of manufacturers, all can be used satisfactorily with Stody semi-automatic wires with minor conversions consisting of wire guides, nozzle and nozzle tip. Conversion kits are available from all Stody distributors.

WHERE CAN SEMI-AUTOMATIC HARD-FACING BE ECONOMICALLY USED?—In general, almost any work now hard-faced manually can be completed faster and cheaper semi-automatically with deposits having wear resistance usually superior to manual electrodes of similar analysis. The illustrations are typical of current semi-automatic applications.

Write for circular. Contains a full description of present Stody semi-automatic wires and typical applications.

Available from your Stody dealer.

Check the "Yellow Pages" of your phone book or write direct.



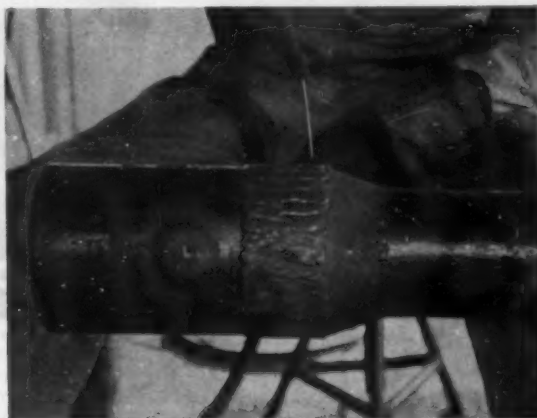
Dredge pump casing hard-faced with a combination of Stody 121 and Stody 100



Shovel track pads rebuilt with Stody Nickel Manganese



Mill hammers brought up to size with Stody Nickel Manganese, using copper form, then hard-faced with Stody 100



Tool joints hard-faced with Stody 130 or Stody 100

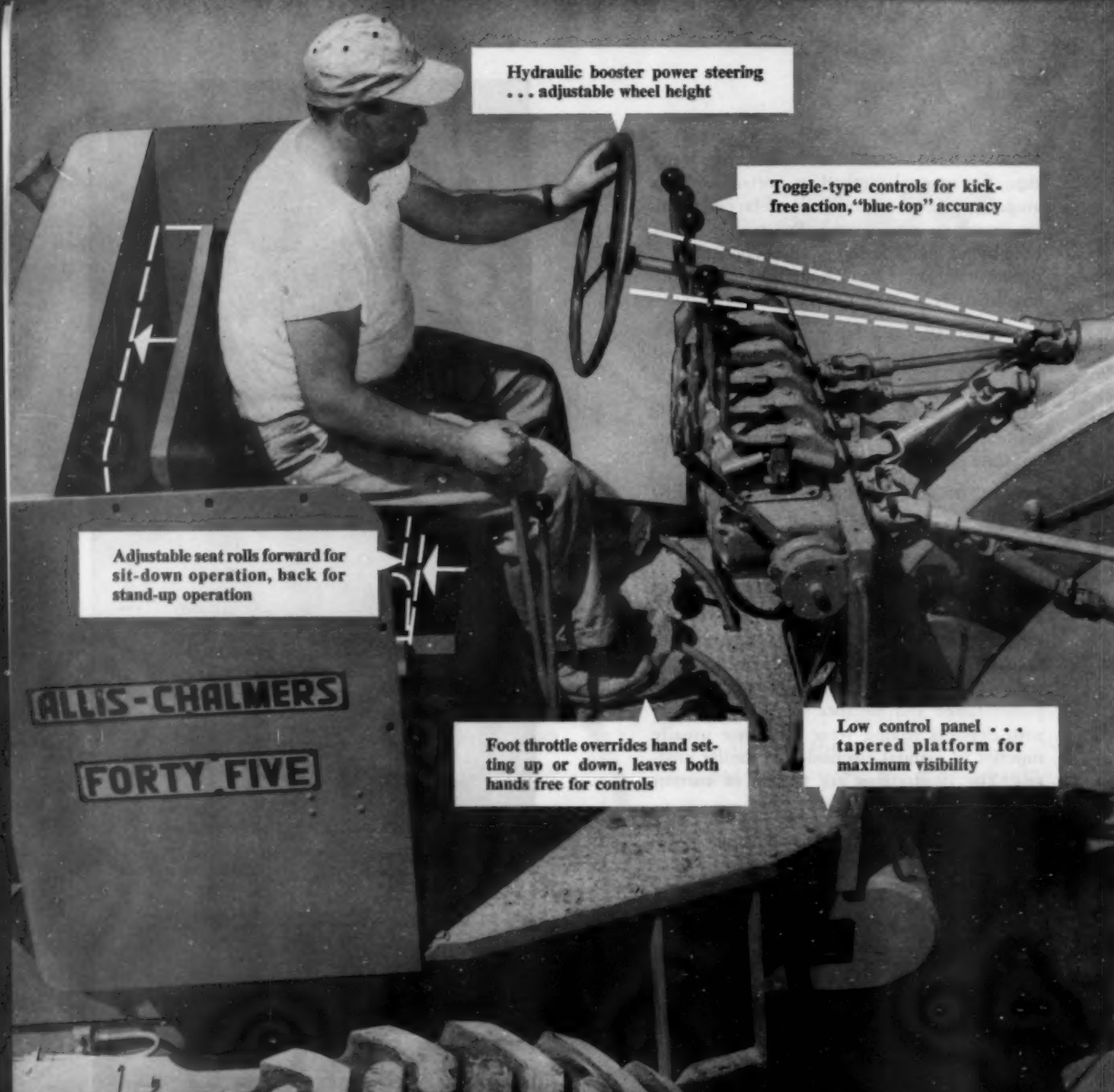
STODY COMPANY

11925 EAST SLAUSON AVENUE
WHITTIER, CALIFORNIA

... for more details circle 298, page 16

ROADS AND STREETS, April, 1957

181



FIVE WAYS YOU CAN BOOST GRADER PRODUCTION

... through operator comfort and control!

Features like these make satisfied operators ... mean more production for you. They're yours in an Allis-Chalmers FORTY FIVE—120 brake hp, 23,800 lb. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

... for more details circle 199, page 16

ALLIS-CHALMERS

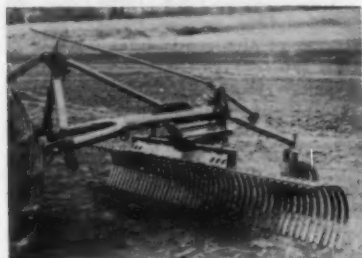
Engineering in Action

What's New in Equipment and Materials

(Continued from page 178)

utility blades has recently been announced by the Arps Corp., New Holstein, Wisconsin. Built with closely spaced spring steel tines, the rake is attached easily by removing two nuts and one pin and sliding the tool into place. The rake may be angled either to the right or to the left or in any one of eight positions. In an angled position, the rake will discharge materials in a windrow; in the normal position, it can be used for grading, leveling and mulching soil.

An optional gauge wheel is readily adjusted to maintain consistent depth penetration for land leveling operations. It can easily be detached when not required.



Arps Rake Attachment

For more information circle 124 on Service Coupon Page 16 and mail now.

Lima Shovel and Crane

The road show saw the introduction of two new additions to the Lima line of shovels and cranes by Baldwin-Lima-Hamilton, construction equipment division. The model 1250 is a 3-cu. yd. shovel with 28-ft. boom and 22 ft. handle, can be employed as a high lift shovel with 45-ft. boom, 32-ft. handle, with 2½-cu. yd. capacity.

The model 1250-SC crane is another high level machine that can operate with a 200-ft. boom and 50-ft. jib to the top of a 24-story building, according to the company. Both air operated rigs can be knocked down for haulage into units of less than 60,000 lb. Side



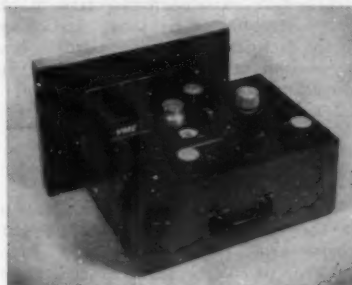
Lima Power Shovel

frames and counterweight segments are removable and the gantry can be folded to a height of 12 ft. 7¼ in. for job-to-job transportation.

For more information circle 125 on Service Coupon Page 16 and mail now.

Portable Seismograph

The Seismolog, a portable seismograph operating on the same principle as an earthquake seismograph, has been



VME Seismolog

announced by Vibration Measurement Engineers, Inc., 7665 Sheridan Rd., Chicago 26, Ill. It measures vibration amplitudes as small as 1/10,000 of an inch which are then photographed and magnified 50 times by a mechanical optical system. Studies of the tape recording, calculated with data on distances, number of holes, amount of explosive charge, enable engineers to make authoritative analysis, reports and recommendations, according to the manufacturer.

The Seismolog is not sold, but is rented in conjunction with the company's record analysis service. Field tests can be made by a contractor or engineer, with photographs of blast vibrations then being sent to the company for analysis.

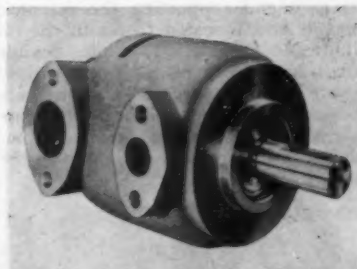
For more information circle 126 on Service Coupon Page 16 and mail now.

Vane Hydraulic Pump

A new series of balanced vane hydraulic pumps for continuous 2000 psi service has been announced by the Denison Engineering division, American Brake Shoe Company. Known as the "T" Series, these pumps have special construction featuring Denison's hydraulically balanced vane. Pumps are offered in this series supplying rated deliveries of up to 100 gallons per minute at speeds up to 1800 rpm.

The pump is available with either clockwise or counter clockwise shaft rotation. Shaft rotation is easily changed by indexing the cam ring to the dowel pin hole with the arrow indicating the desired direction of rotation.

The pump consists of a housing which provides an outlet connection, a bore for support of the shaft bearing and shaft assembly and a larger bore which contains the floating pumping cartridge consisting of a front port plate, vane, rotor and cam ring assem-



Denison Vane Pump

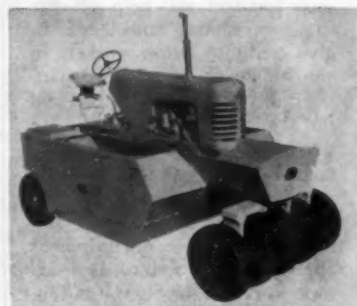
bly and rear port plate with a shaft end support bearing. By providing maximum shaft support, the bearings permit use in applications with higher shaft side loading.

For more information circle 127 on Service Coupon Page 16 and mail now.

Self-Propelled Roller

A new roller exhibited at the road show by Tampo Mfg. Co., 1146 W. Laurel, San Antonio, Texas, is an 11-wheel, self-propelled model called the SP-11S. With forward and reverse speeds from 3 to 22 mph, the machine has an 88-in. rolling width, gross ballasted weight of 22,600 lb.

Features include power operated reversing clutches with torque converter, automotive power steering, single lever control for both travel direction and throttle setting, 12 volt electrical system, and throttle controlled mechanical governor—all standard equipment. The 265-cu. in., 65-hp engine of the SP-11S is available for both gasoline and diesel fuels.



Tampo Roller

For more information circle 128 on Service Coupon Page 16 and mail now.

Midget Concrete Vibrator

A new lightweight concrete vibrator featuring a head only 1¼ in. in diameter is announced by Stow Mfg. Co., 65 Shear St., Binghamton, N. Y. The new vibrator head is driven by a ½ universal motor at 12,000 vibrations per minute.

Because of the small head, the vibrator is said to be effective for vibrating concrete in narrow forms such as precast work, bank vaults, manholes, etc. It is also ideal for builders on small jobs such as sidewalks and cellar floors. The vibrator has duplex ball bearings

at each end supporting the eccentric weight and is sealed to retain the oil lubricant for life. The 4-ft. flexible shaft has a core made of the highest grade of music wire and a strong rubber-covered casing. The universal motor is rated at 6.6 amps at 11,000 rpm; it has a trigger switch mounted in the handle.



Stow Midget Vibrator

For more information circle 129 on Service Coupon Page 16 and mail now.

Dowel Basket Assembly

A new heavy duty type dowel basket assembly has been manufactured by Universal Form Clamp Co., 1238 N.

HELP! HELP!

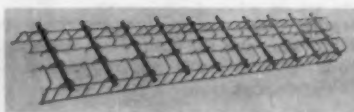
Articles, Pictures and Comments Invited from Readers

Articles are invited on subjects you feel will help advance the professional knowledge, or give credit to fellow workers in your highway or street department or contracting organization for a job well done—

- "How It Was Done"—brief facts on job methods or how problems were solved and work expedited, with pictures and sketches. Examples of equipment application and results—clearing, rock work grading, stabilization, paving, aggregate production, drainage, structures, roadside, etc. etc. etc.

- Engineering developments and examples of practice which you feel qualified to review in connection with your department's program — administration, planning, location, design, specifications, materials, inspection, maintenance, or other.

Articles accepted will be paid for. Typewritten, please. Put it in the form of a letter if you find it easier. Address The Editors, Roads and Streets, 22 West Maple St., Chicago 10, Illinois.



Universal Dowel Assembly

Kostner Ave., Chicago. Completely assembled and welded units are furnished along with all other transverse and longitudinal joint requirements such as stake pins, base plates, construction or expansion materials, hook bolt assemblies or tie bars. According to the company, the new assembly has been used on toll roads and on the Ohio and Indiana Turnpikes.

For more information circle 130 on Service Coupon Page 16 and mail now.

45-Ton Truck Crane

The P&H 575-TC truck crane shown at the road show by Harnischfeger Corp., 4400 W. National Ave., Milwaukee 46, Wis., features hydraulic control, independent planetary boom lowering, live roller circle, double adjustable hook rollers. Also included, according to the manufacturer, are anti-friction bearings, all-welded construction and alloy steel lattice boom.

The carrier has a one-piece frame said to be weave-proof and sway-proof. The turret is welded integrally with the chassis, with a heavy bogie beam with spherical bearing pads said to add extra stability.



P&H Truck Crane

For more information circle 131 on Service Coupon Page 16 and mail now.

Tow-Type Rock Breaker

Economical production of roadbed aggregates from native or oversize materials can be accomplished with the Bros Preparator, according to the manufacturer, Wm. Bros Boiler & Mfg. Co., 1857 10th Ave. S.E., Minneapolis 14, Minn. This new in-place materials reducer, presented at the road show in Chicago, is towed at 1-1½ mph, can make production rates of 150 to 400 cu. yds. per hour, varying with the abrasive quality of the rock materials, according to the company.

Powered by a 182 hp diesel engine, this impact breaker reduces windrowed rock up to 30 in. in diameter. Weathered rock breaks along natural lines of cleavage, with 22 special alloy hammers, rotating at 1,000 rpm., reducing the pieces to 2 in. minus in one pass. The machine also features variable speed transmission for added efficiency in reduction for soft-to-hard rock materials, and pulverization of slab-like asphalt materials for re-use.



Bros Rock Breaker

For more information circle 132 on Service Coupon Page 16 and mail now.

Noise Cover for Hammer

A sound-squelching Muffle Cover for its Model 25 paving breaker was a feature of the road show exhibit of Thor Power Tool Co., Aurora, Illinois.

Company engineers say the new cover reduces air hammer noise intensity up to 55 per cent, according to results of extensive field testing with street maintenance officials, public service companies and contractors working in quiet zones, downtown offices and hotel sections and inside industrial plants.

The new accessory is a thick, double jacket of sound-proofing materials that zips around the paving breaker. It reduces the exhaust noise and the sharp staccato of the piston hammer hitting the tappet. The "soft thud" of the breaker's steel striking the material being worked is all that remains, according to the company.



Thor Hammer Cover

For more information circle 133 on Service Coupon Page 16 and mail now.

Wet Mix Concrete Applier

A new pneumatic concrete gun has been introduced by the True Gun-All

Equipment Corp., P. O. Box 2526, Tulsa, Okla. The Gun-All is said to deliver up to four cu. yd. in place per hour, with water-cement ratio controlled mechanically. It will handle concrete of any moisture content and is claimed to handle wet sand with efficiency.

The entire unit, in the Model C, measures 82 in. in length, 31-in. wide. Overall height with gasoline motor is 68 in., 59 in. with electric motor. Approximate weight is 2560 lb. Compressor furnishes 125 cfm. Hose is standard 1½-in. material hose.



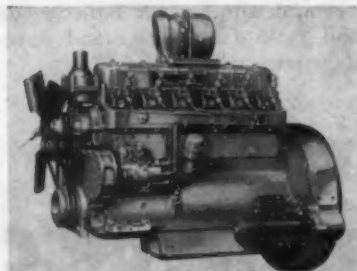
True Concrete Applier

For more information circle 134 on Service Coupon Page 16 and mail now

Supercharged 6-Cyl. Engine

A new heavy duty, 4-cycle, 6-cylinder diesel engine was presented at the road show by Waukesha Motor Co., Waukesha, Wis. The engine has 302-cu. in. displacement and features an exhaust turbocharger system of supercharging. Without intercooler, maximum power available from the model 197-DLCS is said to be 131 hp at 2800 rpm.

Advantages claimed for the exhaust turbocharger system are said to include reduction of parasitic load, relatively light and compact installation, flexibility in mounting, and elimination of mufflers on most applications due to smoothing out of the exhaust impulses by the turbocharger turbine.



Waukesha Diesel

For more information circle 135 on Service Coupon Page 16 and mail now

14.2 HP Crawler Tractor

A new crawler tractor with a 35-to-1

(Continued on page 188)



CARAVAN AXLES

rugged Trouble Free mobility

Caravan axles are your guarantee of "Rugged, Trouble Free Mobility" on rough construction terrain and for positive high speed trailing. Your men in the field are assured of dependable performance when their mobile equipment is mounted on quality-built axles by UNITED.

Caravan axles are available as single axle, two wheel assemblies and as four-wheel running gear. Equipped with automotive type steering mechanism, adjustable camber, caster and toe-in.

Designed and engineered for construction, military and industrial equipment with a capacity up to 20,000 pounds.



Literature and individual counsel are available upon request.



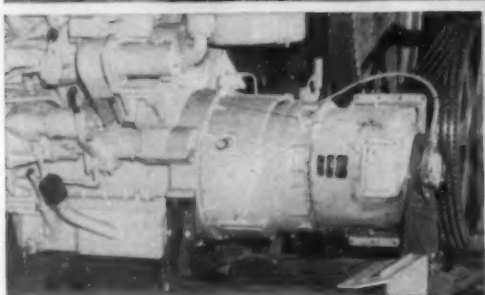
THE UNITED MANUFACTURING CO.

3637 WEST 56TH STREET • CLEVELAND 2, OHIO

... for more details circle 311, page 16



Equipped with a Twin Disc Torque Converter, this 2½-yd. Lorain L-85 Shovel is working on heavy highway grading near New Stanton, Pennsylvania, for Lycoming Construction Co., Williamsport.



Inset (left) is a Cat D337 Diesel Engine-Twin Disc Torque Converter combination which is available in the Lorain L-85.

How torque converters assure higher dividends from your major equipment investments

Twin Disc Torque Converters, dependably and efficiently transmitting power to your heavy-duty machinery, *assure you a higher return on your equipment investment, through more work done in less time . . . with a minimum of maintenance and costly downtime.*

Here are five profitable, proved reasons why Twin Disc Torque Converters help you to earn *more* from your other equipment investments . . . such as the Lorain L-85 Shovel pictured above.

1. The torque converter eliminates lugging and stalling . . . permitting engines to work in the maximum efficiency range *all* the time, delivering *constant* high-horsepower output—getting more work done.

2. Experience has proved that *smooth* converter power reduces peak

loads throughout the shovel drive train because fluid within the converter absorbs much of the impact energy resulting from a quick drum speed change . . . thus protecting *both* driving and driven equipment.

3. When necessary, the torque converter smoothly delivers approximately twice normal torque to the drum, which, at slow digging speed, represents an important advantage in power delivered to the dipper.

4. Cable life is extended since no sharp impact loads ever reach cables through the torque converter. Constant line tension is maintained . . . there is no jerking or snapping.

5. An infinite variety of ratios is available to work with, permitting smooth, accurate control of loads and delicate "inching" or "holding" under power.

Specify a torque converter in *your* next new machine, or when you re-power. And investigate the advantages of Twin Disc Torque Converters—both single-stage and three-stage—for most other heavy-duty applications from 30 to 1000 hp.

For details, request Bulletin 508 and 135-E (single-stage and three-stage respectively.)



TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division), Rockford, Illinois

. . . for more details circle 309, page 16

ROADS AND STREETS, April, 1957



A Pennsylvania contractor uses a 3-yd. Bucyrus-Erie 71-B shovel to load out rock from Dale Cut on the northwestern extension of the Pennsylvania Turnpike near Wilkes-Barre. For ditching and culvert work on another section near White Haven, he assigned the job to his 1½-yd. 38-B dragline.



Bucyrus-Eries Stand Out for Ability to Stand Up

Just one more reason why Bucyrus-Erie excavators are producing profits for contractors on hundreds of roadbuilding jobs all over the country: their ability to stand up, to deliver high output month after month with minimum downtime.

Outstanding performance under toughest conditions is the result of Bucyrus-Erie's close attention to quality in the factory, etc. . . . where research and design testing and manufacturing aim for perfection in every detail. Castings for these machines are poured in Bucyrus-Erie's

own foundries. Modern forging and heat treating methods assure the strength, toughness, and hardness demanded for heavy field duty.

Such careful attention pays off in machines that are designed to deliver sustained high output at low cost over a long period of time.

Let us give you the complete story of how Bucyrus-Erie ¾- to 4-cu. yd. excavators readily convertible to lifting crane, dragline, and clamshell—plus dragshovel on machines through 2½-yd.—can boost your profit margin. 311E56

**BUCYRUS
ERIE**

South Milwaukee, Wisconsin

. . . for more details circle 213, page 16

ROADS AND STREETS, April, 1957

What's New in Equipment and Materials

(Continued from page 185)

gear ratio delivering 14.2 draw-bar horsepower has been announced by Stephen Products, Inc., Crystal Lake, Ill. Weighing approximately 2000 lb., and carrying either a diesel or gasoline engine, the SPI-66 G is claimed to fill the gap between rubber-tired tractors and heavy crawlers. It is 40½-in. wide, 40-in. high and 88-in. long, with its size plus clutch and differential steering making it extra maneuverable, according to the maker. It can be transported in small trailer or pick-up truck.

Attachments include: high lift loader; 30-in. rotary tiller; scoop complete with long rails, all brackets and support arms; front mount scoop with short rails to interchange with dozer blade; electrical system; 4-ft. offset or cover crop disc; hydraulic system; angle dozer blade with carbon lip; 5-tooth scarifier operated with hydraulic kit; implement power take-off; plow 12 in.; plow 14 in.; coulter; 7-arm shovel tooth cultivator; spring tooth harrow; rear power lift; dual hydraulic kit including cylinder, 4-way valve-hose and fittings.



Stephen Crawler Tractor

For more information circle 136 on Service Coupon Page 16 and mail now

Locking Differential

A new locking differential developed by the Dana Corp., Toledo 1, Ohio, was exhibited at the Chicago road show. The new rear axle, known as the Spicer Thornton Powr-Lok, is said to make driving safer at high speeds and improve car performance under adverse driving conditions created by snow, rain, mud, or bumpy roads.

The advantages result from the axle's ability to automatically transfer maximum driving power to the rear wheel having the best traction, according to the company. Regular axles ordinarily divide the power equally between both rear wheels. If one wheel slips or spins, the other wheel cannot compensate for the resultant unbalance by receiving more power from the engine, it was said.

With the new Spicer Thornton Powr-

Lok, according to the manufacturer, high speed driving becomes safer in many different ways, regardless of whether it is on a modern super highway or a hazardous secondary road. On turns, for example, it permits the outer wheel to turn faster than the inner wheel but applies the major driving force to the inside rear wheel, thus increasing stability and improving cornering at high speeds.



Spicer Thornton Differential

For more information circle 137 on Service Coupon Page 16 and mail now.

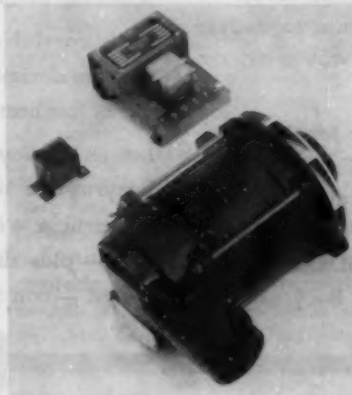
Power Supply Package

A new self-contained AC power supply for mobile lighting and heating requirements is now available from the General Electric Company's specialty motor department.

Consisting of an alternator, a regulator and rectifier, the power supply package may be used with lighting systems on application such as crop harvesting equipment, power boats, construction vehicles, power shovels, railway maintenance-of-way equipment as well as heating systems on bakery trucks.

Operating independently of any other source of electrical power, the new power supply package may be applied wherever an accessible rotating shaft exists for a lighting, heating, or other non-frequency responsive load.

Specifically intended to be belt-coupled to a rotating shaft, the alternator has an automotive-type three-point mounting for easier installation and adjustment of belt tension. The unit can withstand rotational speeds up to 10,500 rpm. It does not require inter-



GE Power Package

connection with existing electrical systems.

Pre-set at the factory, the regulator is a finger-type unit and capable of holding output voltage variation to three per cent from no load to full load, and from minimum to maximum alternator speeds.

For more information circle 138 on Service Coupon Page 16 and mail now.

High Volume Sprayer

A lightweight, high volume spray rig that pumps liquid water repellents, form oils, alcohol and all similar fluids directly from original 55 gallon drums to spray nozzle has been announced by Gray Company, 1087 Sibley St., N. E., Minneapolis, Minn.

Fingertip trigger on spray gun automatically starts and stops the air powered pump. Adjustable nozzle on gun can be quickly varied for heavy or fine spray to suit the operation. Pump operates either in open head or 2-in. bung opening of original drums, without exerting pressure on drum, is claimed to empty a full size drum faster than the fluid can be poured from the bung.



Gray Sprayer

For more information circle 139 on Service Coupon Page 16 and mail now.

Heavy Duty Cutter

Bush Hog Manufacturing Co. of Selma, Alabama, maker of the Bush Hog heavy duty rotary cutter, has announced a new "Highway Special" cutter.

The new Bush Hog has been safety engineered especially for highway use. Designed to completely eliminate danger of objects being hurled from the cutter and striking passing cars, the Highway Special features heavy chains dragging from front and rear openings. These chains hem in beer cans, soft drink bottles and other types of trash usually found alongside highways so the blades will not hurl them onto the road. Side skids along the entire length of both sides prevent any digging and scalping. The cutter, according to the manufacturer, cuts a smooth swath, and slashes through hardwood saplings up to three inches in diameter. It is con-

(Continued on page 192)

DODGE *PowerGiants*



Dodge T700
Tandem



Dodge P300
Forward-Control



Dodge 600
with Van Body



Special bodies fit readily
on any Dodge chassis



Dodge 500
Stake



Dodge 400
with Beverage Body

MOST **POWER** OF THE **LOW-PRICED 3**

... In every weight class

Dodge Power Giants give you an extra bonus of power.

From 204-hp. pick-ups to 232-hp. tandems, Dodge V-8's outpower the "other two" by as much as 31%. This extra power reduces engine strain, saves wear. What's more, Dodge engines, both V-8's and 6's deliver full power on regular gas.

Dodge hauls more payload, too . . . up to one-third more. And Dodge offers major advantages in driving ease, cab comfort and prestige-building good looks. See for yourself. Your Dodge dealer has a Power Giant to meet every trucking need.



Dodge C.O.E. 700
Tractor



Dodge 100
Panel

Collect Your Extra Dividends April is Extra-Dividend Month

Get extra dividends in power, extra dividends in payload, extra dividends in performance . . . plus a special extra-dividend deal on a new Dodge Power Giant.

DODGE TRUCKS WITH THE FORWARD LOOK 

... for more details circle 220, page 16
ROADS AND STREETS, April, 1957

Cores are Basis for Contractor Payment

Long-established coring specifications found satisfactory by both engineers and by contractors, who are docked if pavement thickness is skimped.

By F. C. Witkoski

Director of Testing and Research, Pennsylvania Department of Highways

THE Pennsylvania department of highways has long used a standard method of core drilling of concrete pavements constructed under contract, which has eliminated controversies between contractors and the department.

The department's concern about actual thickness and condition of concrete pavements dates back to 1918; in the following year the idea of making actual measurements of the slab by means of cores removed by drilling was initiated. In addition to slab density, the department was interested also in definitely establishing location of reinforcing steel, in making a visual inspection of concrete and in some cases to determine compression strength. Core removal also made possible a check on subgrade.

• **Early History.** Lacking specifications controlling core drilling between 1919 and 1929, department engineers made several experimental checks on completed pavements during the period. The information secured from these investigations indicated that this method would give the department assurance that specifications had been complied with, thus guaranteeing full value received on the contract investment.

Development of equipment and drilling procedure during the 10-year period showed that cores satisfactory for true compression testing and visual inspection were obtainable as a routine procedure. Removal of cores also provided a true check, for the first

time, of the location of reinforced steel used on the job.

Removal of an adjacent shoulder section — it was found in those early days — also made possible the measurement of the slab edge and inspection of sidewall to guard against honeycombing and other defects. The entire operation produced a permanent record of the pavement prior to department acceptance.

The department's present specification covering the operation and contained in all contracts dates from 1929. The introduction of the procedure into contracts was welcomed by reputable contractors, as they recognized that the method was equitable and eliminated chiseling by unethical bidders who might attempt to cut corners on the amount of concrete placed and who might relax on subgrade and edge construction.

Initial specification required a minimum of one core and one edge measurement for each 1,000 sq. yd. in each traffic lane taken at the location designated by the engineer in charge of the drilling operation. Cores were permanently numbered and stored for record.

All cores failing to meet thickness requirements were turned over to the materials laboratory with the core drilling inspection record. A 0.25-in. tolerance under the specification thickness was allowed. Reduced thickness between 0.25 in. and 0.50 in. resulted in a reduced unit price. Any shortage greater than 0.50 in. had to be corrected; the slab removed and re-

placed with concrete of specified thickness. Except for establishing a standard percentage of reduction in unit prices in penalty payments and a greater tolerance in connection with removal and replacement, this same specification is still in effect.

Present specifications require cores taken on a lane basis as directed; each core representing not over 3,000 sq. yd. of concrete pavement or base, where a measurement found deficient more than $\frac{1}{4}$ in., cores must be taken at each 100 ft. interval in both directions along the lane, until the full specified thickness is found. Current specifications require removal and replacement where deficiency exceeds 0.65 in. The present graduated scale of contract price percentage allowances is as follows:

Deficiency in Thickness as Determined by Cores	Proportional Part of Contract Price Allowed
0.00" to 0.25".....	100%
0.26" to 0.30".....	95%
0.31" to 0.35".....	85%
0.36" to 0.40".....	75%
0.41" to 0.45".....	50%
0.46" to 0.50".....	25%
0.51" to 0.65".....	0%

• **Core Measurements** are made with the measuring gauge shown in the accompanying photograph. The core is placed in the guide on the base centering the core under the gauge and the circular rule graduated in .05 in. graduations is inserted through the guide collar in the top of the gauge. A direct reading to .05 in. is read on the gauge at the top of the guide. This measuring device, believed to be original to Pennsylvania, has proven satisfactory in all respects and measurements made with it have been accepted by all concerned in those cases where arbitration is necessary.

• **Drilling Methods.** Original study and experiment indicated that the "Calyx" core drill, using chilled steel shot, was the most economical and

satisfactory as the cutting medium. This type drill is still used. The drill equipment including the gasoline power unit is mounted on a 1½ ton truck. The power is transmitted directly through gears to the vertical shaft extending through the truck body to which is attached the tubular steel cutting bit. The bits are made of standard steel tubing and the cutting end is slotted to feed the excess shot under the cutting edge.

No. 8 chilled steel shot is used and No. 12 steel grit is used to start the cut. Cooling water is fed into the top of the bit from a supply tank mounted on the forward end of the truck. A guide formed from 2-in. planking is used to hold the shot in place when the cut is started. The amount of water and shot or grit required is controlled by the operator and varies with the character of the aggregated use in the concrete. The drill head is designed to accommodate 5, 6, and 10 in. bits and bits are quickly interchangeable. The 10-in. bits are used for removing large cores necessary in the investigation of joints and load transfer unit installations.

The drill is hand fed and all controls of the power unit are extended within easy reach of the operator. The truck unit carries as necessary tools

and equipment including a supply of water, shot, grit and bits which enables the crew to proceed from job to job as a complete mobile unit. The character of the concrete encountered determines the amount of shot and/or grit required per core and also the time required. From 1 to 2 lb. of shot and/or grit is used, and the extraction of the core may vary from 8 to 15 minutes where cores are required for measurement only. This time includes the movement from one station location to the next station location.

• *Drilling Costs* including equipment rental, salaries and expenses on a per core basis vary with the number of cores drilled and miles traveled. The cost per core over the past four years has varied from \$0.65 to \$1.65 per core.

Mobile core drilling units operate under the control of the materials division and are based at the central laboratory in Harrisburg. Requests for pavement core drilling are received from the respective districts in which the pavement is constructed and the drill units are assigned to do the required drilling and testing. Depending upon completion dates the mobile unit and crew may be on assignment through two or more dis-

tricts for extended periods. On extended trips the required shot, grit and bits are shipped ahead to department maintenance headquarters in each county where they are then obtained by the drilling crews.

• *Drilling Under Traffic.* In many cases drilling can be accomplished prior to opening of the road to traffic. However, when a road is drilled while under traffic, no great difficulty is experienced as only one lane need be obstructed at any one time. All necessary safety precautions are enforced and due to the general increase in traffic no drilling is done on Saturdays or Sundays.

The holes in the pavement resulting from the removal of cores are closed by patching with a rich dry concrete mix thoroughly tamped. This operation is accomplished by a maintenance crew assigned to the operation by the maintenance superintendent of the respective county in which the drill is operating. This method has proved entirely satisfactory and with care such patching can be made almost invisible.

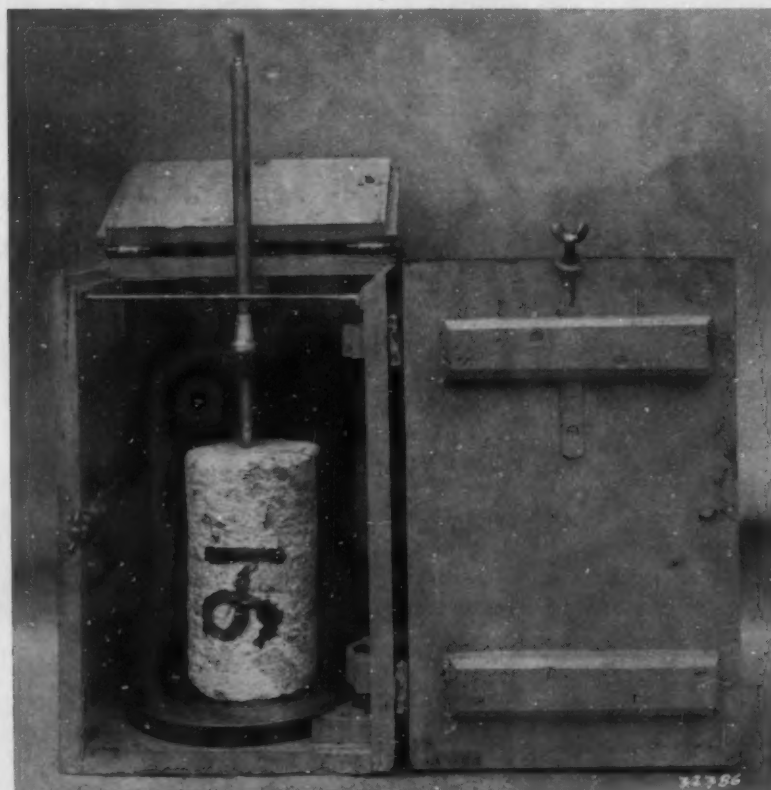
Pennsylvania department engineers, in conclusion, feel that core drilling has been successfully used in investigating old pavements and in various special investigations of both old and new pavements. In general the operation has proven to be a good investment and highly satisfactory to both the department and the contractors.

The foregoing details were supplied by F. C. Witkoski, director of testing and research, in charge of the Pennsylvania department of highways testing laboratory. J. J. Lawler is Pennsylvania secretary of highways.

With the Manufacturers . . .

HAROLD ROSOFF has been named sales manager of Ledeen Manufacturing Co., El Monte, California. Rosoff has been advertising manager for the past five years and will retain this position along with his new duties. The company, which recently moved into its new \$300,000 plant in El Monte, manufactures valves, cylinders, valve actuators and air-hydraulic pumps and boosters.

THE DAVID WHITE INSTRUMENT COMPANY of Milwaukee, Wisconsin, and Sperry Gyroscope Ottawa Limited have jointly announced that Sperry Gyroscope Ottawa Limited has been appointed sole distributor for Canada for the complete line of David White surveying instruments. Sperry Gyroscope Ottawa Limited will be able to handle all servicing and repairs, it was said.



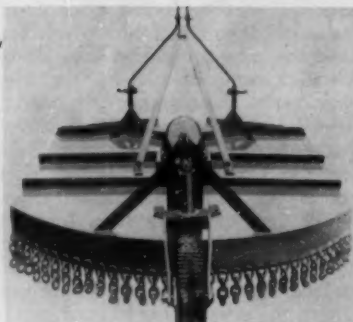
• Field measuring device for gauging pavement core thickness.

What's New in Equipment and Materials

(Continued from page 188)

structed of thick (at least $\frac{3}{8}$ -in.) plate steel throughout and features a solid, one-piece arc-welded frame.

For more information circle 140 on Service Coupon Page 16 and mail now.



Bush Hog Rotary Cutter

ON
OR
OFF
HIGHWAYS



WISCONSIN ENGINE- powered equipment ranks **FIRST** in the world

Whether striping highways with a Meili-Blumberg Traffic Line Marker, mowing shoulders with a National Mower Company mower or handling many, many other 3 to 56 hp. tasks . . . you'll see more Wisconsin Engine-powered equipment at work on and off highways than any other type.

One Wisconsin policy stands out as a reason for this preference. Wisconsin engineers believe that dependable long-term service starts and ends in heavy-duty construction and features. *Smallest or largest* Wisconsin Engine, no short cut in quality is ever taken. Why not learn more about why Wisconsin Engines are truly heavy duty engines. Write for bulletins S-195 and S-207 on new 56 hp. Model VR4D.



**WISCONSIN MOTOR
CORPORATION**

World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN

A 7-6091-1/2 I

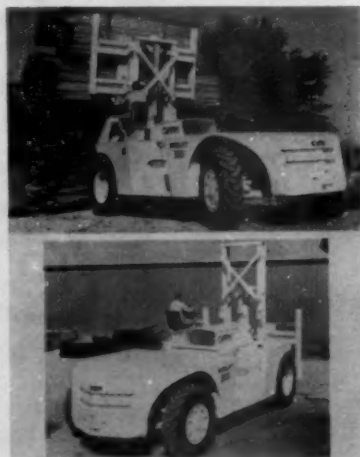
. . . for more details circle 317, page 16

Outdoor Fork Truck

The operator sits above the left front fender for a clear view of the load on a new 35,000-lb. capacity pneumatic tire fork truck announced by the industrial truck division of Clark Equipment Company.

Named the Clarklift Y-350, the machine is designed for heavy lifting and tiering work around steel mills, lumber yards, construction sites and similar outside locations. A power shifted, four speed transmission coupled with a torque converter and a 404-cu. in., six cylinder Hercules gas engine provide power for operation through mud and snow and over rough terrain. Tire size is 14.00 x 24.

Placement of the driver at left front insures full visibility when raising or placing a load. Direction selector levers and lift-lower-tilt levers are located on the steering column for fingertip control. Power steering and air service brakes are standard.



Clark Fork Truck

For more information circle 141 on Service Coupon Page 16 and mail now.

2-Yd. Tractor Shovel

A new 2-yd. capacity tractor shovel with torque-matic full-reversing transmission is introduced at the road show by N. P. Nelson Iron Works, Inc., Clifton, N.J. The machine weighs 18,600 lb., offers either a GM diesel engine with 102 hp or a Continental gasoline engine of 117 hp. Other features of the model 200 are 4-wheel drive, planetary axle, and underslung arms for added visibility, said the company.



Nelson Tractor Shovel

Listed as standard equipment are adjustable seat, complete lighting equipment, hydraulic power booster steering, parking brake, vacuum-boosted 4-wheel hydraulic brakes, engine oil filter. The machine has a maximum forward speed of 28.3 mph, reverse 27.4 mph.

For more information circle 142 on Service Coupon Page 16 and mail now.

Ripper for Motor Grader

The Swanson Ripper is a new tool designed for ripping outside of the



Swanson Ripper

width of the wheels or outside the cutting width of the blade of a motor grader. It holds a standard make of ripper shank while the work is being performed. The new tool, designed and built by the Swanson Mfg. Co., San Diego, California, will effectively rip asphalt, hard pan, stratified rock, shale adobe, and concrete of reasonable thickness. It is said to be effective for curb gutters, terraces and sloping banks and for hard-to-get-at work such as cutting close to stakes.

The ripper, now being manufactured in two models for use with the No. 12 Caterpillar motor grader, can be used with equal effectiveness on either the right or left hand side of the machine by merely reversing the tool, which is quickly attached to the grader mold-board frame.

For more information circle 143 on Service Coupon Page 16 and mail now.

50-oz. Air Hammer

A new Big Bully air hammer, model SP1200, just announced by Superior Pneumatic & Mfg., Inc., 4758 Warner Road, Cleveland, Ohio, weighs 50 oz., measures 6-in. long and consumes 6.5 cfm of air at 1500 psi. Easily operated with one hand, it has a metering trigger, lets the operator control the hammer's power anywhere from 0 to 9000 blows per minute. The model SP 1200 attains full speed and power of operation on less than 7 cfm, doesn't require a large volume compressor.

According to the manufacturer, the rapid stroke of the hammer makes it an excellent unit for cutting metal with a cold chisel, scaling and cleaning



Big Bully Air Hammer

welded joints, grooving steel or cast iron, finishing and forming light metal, cleaning castings, star drilling, etc.

For more information circle 144 on Service Coupon Page 16 and mail now.

Small Power Roller

W. Whitney Stueck, Inc., Old Saybrook, Connecticut, has introduced a newly designed power roller for driveway, sidewalk and parking area paving, as well as landscape and golf course work. The Easy Roll, as it is called, is available in four models, each with specific rolling applications.

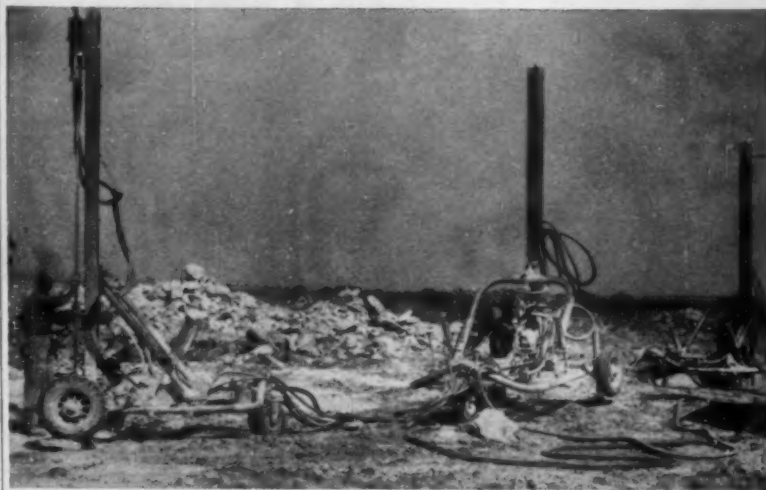
The All-Purpose model is for asphalt paving and similar work where a sprinkler system is required to cool or lubricate the roll surfaces. It is

(Continued on page 197)

AGGREGATES FOR KANSAS TURNPIKE quarried with Brunner & Lay ROK-BITS.



Carbide ROK-Bits—cross, chisel, "X", cut-away, taper socket bodies—standard, J-750; 200; 400; 600 types—gauge sizes: 1 1/4" thru 6".



Distributor: Martin Tractor Company, Topeka, Kansas.

Aggregate production for the Kansas Turnpike called for a 1,500,000 ton one season run. Wagon drills equipped principally with Brunner & Lay ROK-Bits® put 3 1/2" blast holes down through the 20-ft. limestone ledge. ROK-Bits gave increased drilling speed, greater footage life, fewer bit changes and lowest cost per foot of hole drilled which all added up to lowest cost per ton of aggregate. Jobs that call for top production, call for Brunner & Lay ROK-Bits. Put their cost-cutting features to work for you. Write for new catalog #756.

Brunner & Lay Products

Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. • Brunner & Lay Rock Bit of Philadelphia, Inc., 2514 East Cumberland St., Philadelphia 25, Pa. • Brunner & Lay of Los Angeles, Inc., 2425 East 37th St., Los Angeles 58, Calif. • Brunner & Lay, Inc., 150 Leslie St., Dallas, Texas • Brunner & Lay Rock Bit of Asheville, Inc., Sweeten Creek Rd., Asheville, N.C. • Brunner & Lay of Portland, Inc., 660 N. Tillamook St., Portland 12, Ore. Birmingham Rock Bit Co., Inc., 5-18th St., S.W., Birmingham, Ala.

... for more details circle 331, page 16

CLEVELANDS dig 200 miles for water system in Gwinnett County, Ga.

Buchanan Pipe Line Company, Inc. of Birmingham, Ala. used 5 Cleveland trenchers to dig 200 miles of trench for a county-wide water system in Gwinnett County, Ga.—a multi-million dollar project requiring approximately 275 miles of pipe work. Digging 11" to 30" wide and 2½' to 4' deep in rolling terrain and in soil ranging from rock to sand clay, each of the 5 Cleveland averaged 3,000 feet of trench per day, working in wet weather.



Paul A. Buchanan, executive vice president of Buchanan Pipe Line Company, Inc., says this about Clevelanders:

"We have bought 12 Clevelanders since 1945, are now operating 6. Their performance has been entirely satisfactory, as evidenced by our repeat orders. In wheel-type machines we have standardized on Clevelanders. We particularly like their simplicity of operation and maintenance and their good performance under adverse conditions."

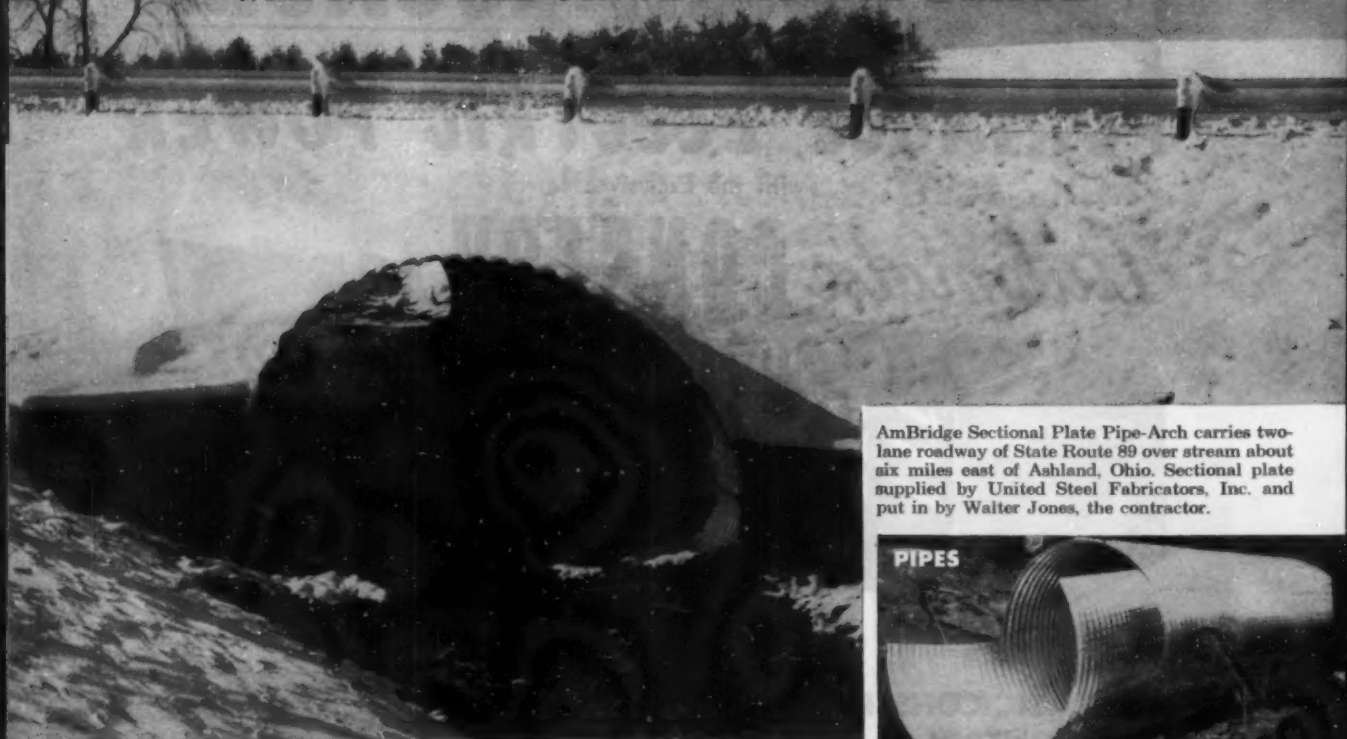


THE CLEVELAND TRENCHER COMPANY

20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO

... for more details circle 224, page 16
ROADS AND STREETS, April, 1957

Eliminate Drainage Problems—Permanently— with **AMBRIDGE SECTIONAL PLATE**



AmBridge Sectional Plate Pipe-Arch carries two-lane roadway of State Route 89 over stream about six miles east of Ashland, Ohio. Sectional plate supplied by United Steel Fabricators, Inc. and put in by Walter Jones, the contractor.

USS AmBridge Sectional Plate Pipe, Pipe-Arches, and Arches are available in a complete range of standard sizes to satisfy the design requirements for *any* waterway opening. They are fabricated to meet all federal and state specifications.

These strong, flexible structures with their 6" x 2" corrugations can resist extremely large externally applied loads.

Special details such as asphalt

coating, hook bolts for concrete headwalls, beveled ends, and skewed ends are furnished as specified for each job. These structures are economical (they eliminate the need for forms . . . and, being made of steel, there is no breakage). They are permanent (they can be extended whenever a fill or road is widened). They go in quickly with a minimum interruption of traffic.

For Culverts Made with USS Galvanized Corrugated Sheets

For your smaller drainage structures, culverts made from USS Galvanized Corrugated Culverts Sheets are available. For the names of firms making these top-quality culverts, write to United States Steel Corporation, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

. . . for more details circle 203, page 16

AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION
General Offices: 525 William Penn Place, Pittsburgh, Pa.

Contracting offices in: AMBRIDGE • ATLANTA • BALTIMORE • BIRMINGHAM • BOSTON • CHICAGO • CINCINNATI • CLEVELAND
DALLAS • DENVER • DETROIT • ELMIRA • GARY • HOUSTON • LOS ANGELES • MEMPHIS • MINNEAPOLIS • NEW YORK
ORANGE, TEXAS • PHILADELPHIA • PITTSBURGH • PORTLAND, ORE. • ROANOKE • ST. LOUIS • SAN FRANCISCO • TRENTON
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

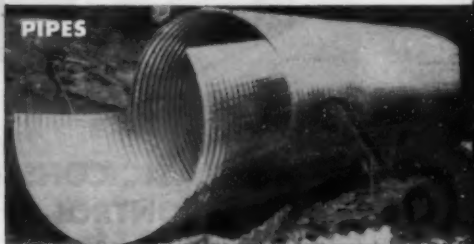
AMBRIDGE SECTIONAL PLATE



7-629

UNITED STATES STEEL

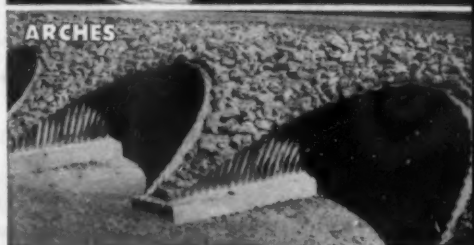
PIPES



PIPE-ARCHES



ARCHES



NEW CATALOG NOW READY

Containing complete information on AmBridge Sectional Plate Pipe, Pipe-Arches, and Arches. Our new 28-page catalog covers design, sizes, weights, gages and assembly instructions. For free copy, just write our nearest office.

WINCO® Gives You **NEW ECONOMY** IN **PORTABLE ELECTRIC POWER**

with the Exclusive New

Automatic **CONSERV-er**
IDLING CONTROL



✓ Extends Engine Life
✓ Reduces Fuel Consumption
✓ Lowers Maintenance Cost



MODEL 205B14S2D-1M9,
equipped with Automatic
CONSERV-er IDLING
CONTROL #24842. Carry-
ing Cradle #23410 option-
al equipment.

AUTOMATIC CONSERV-er IDLING CONTROL—

Plant AUTOMATICALLY idles except when load of 75 watts or more is applied.

205B14S2D Series—

New 2500 watt Direct Drive model, 115, 230, or 115/230 volts, 60 cycles, A.C. Control box with receptacles standard equipment.

LIGHT WEIGHT—Only 161 pounds including optional carrying cradle and optional Automatic Conserv-er idling control.

RECOIL STARTER—Optional equipment at extra cost.

SUPER POWER—King-size generator gives you close, steady, voltage regulation.

EASY TO START—4-cycle Briggs & Stratton engine gives you quick, easy, dependable starting.

EASY TO SERVICE—Engine parts & service stations readily available.

EASY TO USE—Speedy-Shift 2-wheel dolly for quick portability. Easily attached or removed. Optional at extra cost.

**A COMPLETE LINE OF WINCO ENGINE-GENERATORS
AVAILABLE FOR YOUR INDIVIDUAL POWER NEEDS
THROUGH 10,000 WATTS.**

WINCHARGER CORPORATION

Sioux City, Iowa

Dept. RS-47

Please send me full information about Winco portable electric plants with the exclusive new Automatic CONSERV-er.

Name _____

Address _____

City _____

State _____

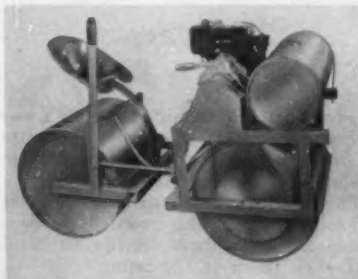
Manufactured by WINCHARGER CORPORATION . . . Sioux City, Iowa

Subsidiary of the Zenith Radio Corporation.

What's New in Equipment and Materials

(Continued from page 193)

powered by a 3.35 hp Briggs and Stratton engine, Snow-Nabstedt reverse gear, two 24 x 24-in. compaction rollers and a 15 gallon sprinkler tank. Without water ballast this model weighs 1475 lbs.



Stueck Power Roller

For more information circle 145 on Service Coupon Page 16 and mail now.

Hydraulic Trencher

A new trenching machine named the Challenge was shown at the road show by Cook Bros. Equipment Co., 3334 San Fernando Rd., Los Angeles, Calif. It is a gear-driven, track-laying trencher which is said to be able to operate over soft terrain and cross open trenches. It will dig square or round bottom trenches between 12 and 18-in. wide and up to 5-ft. 3-in. deep.

The new machine has nine travel speeds, 18 trenching speeds. Vertical digging allows it to trench close to buildings, foundations, curbs, pipes and other obstacles, leaving a minimum of handwork, according to the company. A backfill blade, which is standard equipment, enables the operator to clear a path ahead of the trencher, level off high spots or refill trenches when desired.



Challenge Trencher

For more information circle 146 on Service Coupon Page 16 and mail now.

Distance Measuring Wheel

The Rolatape measuring wheel is



Rolatape Measuring Wheel

designed for measurement of acreage or long line distances and with its 6-ft. circumference wheel is said to be especially adaptable for use in rough terrain. Produced by Rolatape, Inc., 1741 14th St., Santa Monica, Calif., the device has a counter face in plain view of the operator, permitting him to know at a glance the distance measured at any given time.

The Rolatape folds into an easily portable package and has an optional rear mount hitch which permits the measuring wheel to be attached to and operated from the rear of any slow moving vehicle. The unit will measure distances up to 19 miles.

For more information circle 147 on Service Coupon Page 16 and mail now.

All Wheel Drive Trucks

Two heavy-duty all wheel drive models have been added to the International truck line, according to announcement by R. M. Buzard, manager of sales of International Harvester's motor truck division.

These new units—the R-190 (4x4) and RF-190 (6x6)—complete a lineup

of all wheel drive International trucks that now ranges in gross vehicle weight ratings from 7,000 to 43,000 lb.

Model R-190 (4x4) is rated at 29,000 lb., and is available in four wheelbases from 142 to 193 in. Model RF-190 (6x6) is available with choice of bogies to provide ratings of 38,000 or 43,000 lb. Four wheelbase lengths range from 157 to 211 in.

A new front axle design featuring a one-piece center section is combined with outrigger-type front spring mounting for better stability and a minimum increase in front-end height. Low rear-end loading height is accomplished without the need for cutting and dropping the frame in back of the cab.

For more information circle 148 on Service Coupon Page 16 and mail now.

Rubber Tire Roller

The Bros SP-54, a 9-ton self-propelled rubber tire roller for compacting asphalt, sealcoat work and shallow lifts, was presented at the road show by Wm. Bros Boiler & Mfg. Co., 1057



Bros Rubber Tire Roller

10th Ave. S.E., Minneapolis 14, Minn. It features full oscillation of all wheel pairs, torque converter drive and a 50



International Truck

hp engine with sufficient power to pull 15-ton tow-type rollers.

Other features include direct chain drive to both rear wheel pairs, automotive type hydraulic steering and individual hydraulic brakes on rear wheel pairs. Accessory equipment includes optional 77-gal. sprinkler system and headlights and tail lights.

For more information circle 149 on Service Coupon Page 16 and mail now

Hydraulic Power Cutter

The use of rented Guillotine hydraulic portable power cutters completed in less than 24 man-hours the removal of $\frac{1}{2}$ " reinforcing rod to prepare an old foundation for new construction, according to Manco Mfg. Co., Bradley, Illinois.

The Manco company, through contract supply dealers, offers two models of its high speed portable Guillotine hydraulic cutters for rental use . . . one with a capacity to cut $\frac{1}{2}$ -in. mild steel in about $\frac{1}{4}$ second per cut, and the other for cutting 1-in. mild steel in about $\frac{1}{4}$ seconds per cut.



Guillotine Power Cutter

For more information circle 150 on Service Coupon Page 16 and mail now

Hydraulic Ejection Trailer

A new hydraulically controlled ejection trailer with an ejection force of up to 200,000 lb. is announced by Athey Products Corp., Chicago, Ill. Called the PE21, the 31-ton capacity rear ejecting trailer was developed primarily to handle three applications; clean dumping of sticky, hard-to-discharge materials, complete ejection control for spreading the load, and "partial load" ejection into less-than-trailer capacity sized hoppers or crushers.

The unit is powered by the Caterpillar DW21 tractor. A tractor mounted hydraulic pump, operated from the rear power take off, furnishes power to two hydraulic rams mounted on the sides of the trailer. The rams move the ejector plate to the rear, ejecting the complete load. The rams are also double acting to insure the return of the ejector into carry position.



Athey Ejection Trailer

The ejector is carried on precision roller bearings and is retained in positive alignment with the trailer body throughout the entire cycle. The ejector guides, rollers and actuating cylinders are protected from load and impact of the loading shovel.

For more information circle 151 on Service Coupon Page 16 and mail now

Screed for Bridge Decks

A new concrete vibrating screed especially adaptable to bridge decks has been introduced by Stow Mfg. Co., 65 Shear St., Binghamton, N. Y.

A vibrating unit, powered by a $2\frac{1}{2}$ hp. engine, is mounted in the center of the beam. The engine is isolated from the screed's vibration by rubber mounts, including a rubber mounted idler pulley to prevent vibration from being transmitted back through the belt. A new special throttle control is used to control the speed of vibration from one end of the beam. This special throttle control has a locking device, locking the throttle in any position so that it will not move in spite of the vibration of the screed.

The end roller and handle assemblies are also isolated from the screed's vibration by rubber mounts to prevent vibration from pounding down the forms or being transmitted to the operator. The rear end roller on each side



Stow Concrete Screed

is balanced and mounted in such a way that it automatically flips up to support the screed beam off the concrete when the operator lifts the handle up. This, plus the steel handles, makes it possible to push the screed back for a second pass without having to bend over and push on the beam.

For more information circle 152 on Service Coupon Page 16 and mail now

Gen-A-Matic Standard

The Gen-A-Matic Corp., of 14741 Bessemer St., Van Nuys, California, is introducing a new light housing standard, the S1000, for use with the company's two-way flasher light. The stand-



Gen-A-Matic Standard

ard has a 25-lb. cast iron base to insure stability and a hood that fits over the Gen-A-Matic light so that it offers good daylight visibility. Side locks on the standard prevent theft of the flasher light.

Requiring little space, the S1000 light housing standard is ideal for use on construction projects.

(Continued on page 202)

Look at This Brand New
Construction Tool!

THE LORAIN. SP-107



7-TON CRANE...

3/8-YD. SHOVEL-DRAGLINE CLAMSHELL-HOE

will do things no other machine can do!

SQUARE DESIGN—NO OUTRIGGERS . . . The "SP-107" Carrier is 8 ft. wide with 8 ft. wheelbase. With this close-coupled "square" design, you get full rated lifting or digging capacity in every turntable position throughout the 360° swing. With no time-consuming outriggers to set or unset, you get maximum capacity with instant mobility.

TORQUE CONVERTER . . . Gives you automatic adjustment of engine torque to match machine, travel and load conditions. Also provides "throttle control" for precise control of load lowering.

OFF-THE-HIGHWAY SERVICE . . . Powerful 4-wheel drive provides maximum tractive effort for rough terrain . . . big tubeless tires give plenty of flotation for soft ground travel . . . which means the "SP-107" will go most places a crawler will go.

15 M.P.H. MOBILITY . . . You get 3 or 6 travel speeds up to 15 m.p.h. through a smooth, automatic transmission. The "SP-107" is an agile, fast-stepping Self-Propelled Crane that does not need a trailer to move from job to job.

INDEPENDENT TRAVEL . . . This standard feature makes it possible to (1) travel, (2) hoist, (3) swing, and (4) derrick the boom—separately, in any combination, or all at the same time, with each operation controlled by an independent hydraulic clutch. Gives you greater maneuverability and flexibility of operation.

4-WHEEL STEERING . . . For the utmost in maneuverability and shortest turning radii, two-axle steering is available (see diagram). Front and rear axles steer independently of one another, permit maneuvering and working in closer quarters, permit "crabbing" sideways to "snuggle-up" to loads.

Your Thew-Lorain Distributor has the "SP-107" story.

. . . for more details circle 305, page 16

NO OTHER MACHINE CAN MANEUVER LIKE THIS

Single Axle Steering
(Standard)



23 ft. Turning Radius

Two-Axle Steering
(Available)



15 ft. Turning Radius



"Crabbing" Sideways

THE THEW SHOVEL CO., LORAIN, OHIO

THEW **LORAIN**

You save money



Contractor **Lynn Ankrom** of Decatur, Illinois, shown above, has dug over 55,000 feet of ditch with his Buckeye 308 with "no major repairs and no downtime to speak of at all!" Dependable production like this is one of the reasons why "Buckeye" has become the most famous name in ditchers.

The Gar Wood Dozercaster has the stamina required by Euclid's powerful TC-12. Rugged C-frame resists distortion . . . "deep-anchored" lugs can't bend or smash. Screw-type thrust arms simplify moldboard tilting.

GAR WOOD

PLANTS IN WAYNE AND

ROADS AND STREETS, April, 1957

on maintenance when you go Gar Wood-Buckeye

Today's construction proves low input just as important as high output. You can depend on both when you go Gar Wood-Buckeye! With Buckeye ditchers you put in far less time and money on maintenance for the high output these machines deliver. Here's why:

First, Buckeyes are designed to *stand up longer*. Truss-type frame and massive, tractor-type crawlers resist even the heaviest shocks. More anti-friction bearings,

fewer moving parts, and oil-bath lubrication of gears add up to long unit life!

Buckeyes also save money by being *easier to maintain*. Unit construction permits servicing without disturbing other components. Major assemblies and parts are interchangeable, cost less, and are readily available. Contact your Gar Wood-Buckeye dealer for additional facts, or write direct to: Customer Service Dept., Gar Wood Industries, Inc., Wayne, Michigan.



Gar Wood - St. Paul dump bodies and hoists are easy to maintain. Servicing can be carried out by regular mechanics working with ordinary truck tools. "Strong-Arm" hoist design eliminates one-sided dumping strain.



In the Gar Wood 75B, heavy-duty, conical-hook double rollers eliminate pin strain and rocking under load. Massive crawlers are built to take it. Compact design of the machinery deck makes parts easily accessible for servicing.

INDUSTRIES, INC.

Wayne, Michigan

YPSILANTI, MICH.; FINDLAY, OHIO; MATTOON, ILL.; RICHMOND, CALIF.

... for more details circle 236, page 16

ROADS AND STREETS, April, 1957

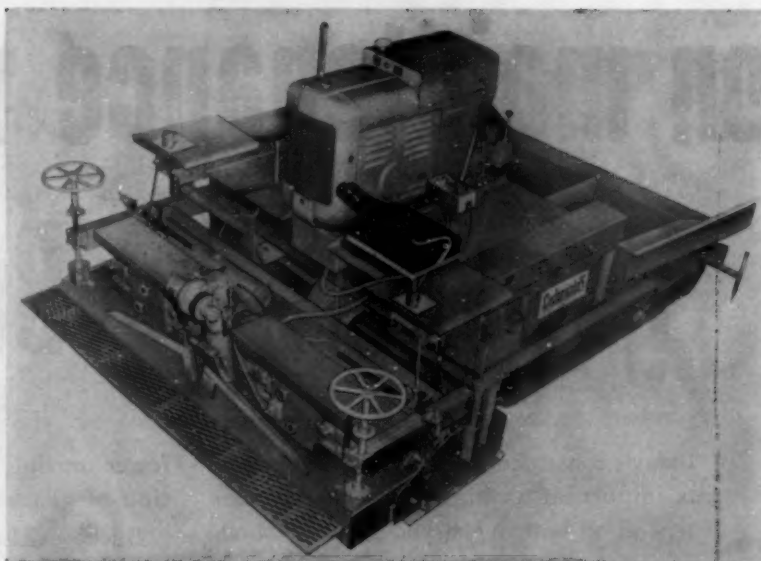
What's New in Equipment and Materials

(Continued from page 198)

New Bituminous Paver

A new Cedarapids bituminous paver introduced by Iowa Manufacturing Co., Cedar Rapids, Iowa, has reached speeds of 102 feet per minute in test runs while handling 200 tons of bituminous material per hour, according to the company. Most important single feature claimed for the new machine is the use of an electrically-vibrated screed which "irons" the bituminous material into a uniform, high density mat. This is said to permit paving at higher speeds since vibrating action of the screed reduces possibility of tearing the mat or causing voids.

The screed, of one-piece construction, is vibrated at 3600 impulses per minute by four electric vibrators, each of which is controlled by a rheostat for regulation of intensity of the vibration. The 24-in. wide, channel-shaped screed is made of 1/2-in. steel plate, is equipped with two screw adjustments with vernier-type gauges for controlling mat



Cedarapids Bituminous Paver

thickness. Paving width can be adjusted from 6 ft. to 14 ft.

For more information circle 154 on Service Coupon Page 16 and mail now.

Wide Material Handling Bucket

New features have been built into a material handling bucket exhibited by

Owen Bucket Co., 6001 Breakwater Ave., Cleveland 2, O.

Pointed out as outstanding features are improvements made toward increasing cable life. The lower closing sheaves are arranged so that the closing line leads straight through the center plane of bucket to first lower sheave, thus eliminating bending of closing line cable around guide sheaves. Diameter of closing sheaves and guide sheaves has been increased and all closing sheaves are grooved for size of wire rope specified.

A lighter, all-welded crosshead is said to afford more strength. Longer and larger 3-sectional top guide bronze bushed rollers are stated to reduce cable slippage or chafing, thus reducing closing line and roller wear.

Longer hinge castings increase length open of bucket, giving greater clean-up area. Larger inside hinge hubs give greater bearing area on main shaft. General shape of the bowl is flatter, minimizing crowding action, and wider for increased clean-up area.



ARROW Mobile HYDRAULIC HAMMERS SPEED UP PRODUCTION

Cuts Costs on Cutting, Breaking, Tamping Jobs

Contractors — Cities — Counties — Public Utilities and others have found ARROW Mobile HYDRAULIC HAMMERS the most efficient, the most economical tool of its kind on a wide variety of jobs. Automatic Hammer Control and Exclusive Creeper Drive, plus operator-controlled impact permits fast, accurate breaking or cutting or tamping of any material to exact specifications. Get the facts about ARROW Mobile HYDRAULIC HAMMERS... they'll put money in the bank for you.

WRITE OR WIRE NOW FOR COMPLETE INFORMATION

ARROW MANUFACTURING COMPANY

194 WEST DAKOTA

DENVER, COLORADO

... for more details circle 320, page 16



Owen Material Handling Bucket

For more information circle 155 on Service Coupon Page 16 and mail now.

Manufacturers' Literature

Metallizing Powder for Crankshafts

A new two-page 8 1/2 x 11 illustrated two-color Engineering Data Sheet (No. 53) discussing the use of the new Colmonoy C-250 metallizing powder for producing superior crankshaft bearing surfaces is now available from Wall Colmonoy Corp., 19345 John R Street, Detroit 3, Michigan.

The new data sheet discusses the properties and characteristics of the new C-250 powder and illustrates the essential steps in crankshaft preparation and application of the material. Also included is a detailed 11-step application procedure recommended by Wall Colmonoy.

For more information circle 159 on Service Coupon Page 16 and mail now.

High Pressure Hose Couplings

A new eight page bulletin describing and illustrating LE-HI heavy duty pressure hose couplings known as Bulletin No. 115 was recently published by the LE-HI division of Hose Accessories Co., 2704 N. 17th St., Philadelphia 32, Pa.

This new publication by LE-HI covers applications of high pressure air, steam, gas, hydraulic, liquid, etc., used according to the manufacturer, everywhere in construction, mining, contracting, petroleum refining, and in general industry.

For more information circle 160 on Service Coupon Page 16 and mail now.

Wire Rope for Construction

By means of photographs and drawings with reeving diagrams, a new brochure by MacWhyte Co. lists the proper wire rope specification for all types of construction equipment.

Included is a discussion of Lang Lay vs. Regular Lay rope constructions and proper wire rope to use for clamshell bucket operation.

"Wire rope must meet three main requirements: Strength—Abrasion—Flexibility," brochure states. "In all recommendations, these three factors must be weighed and the rope selected that will meet all three to the best advantage."

For more information circle 161 on Service Coupon Page 16 and mail now.

Two-Way Radio "Selective" Calling

General Electric's communication products department, Syracuse, N. Y., has published two bulletins on two-way radio selective-calling. ECR-448 describes "Individual Call," which enables an operator to turn down radio volume until he receives a light or buzzer signal indicating an incoming call.

ECR-439 explains "Group Call," showing how a radio-equipped fleet may be subdivided into as many as ten different groups according to job functions, by types of vehicles, or by locations served. With "Group Call" it is possible for the user to communicate instantly with a specific subdivided group without affecting other units in the fleet.

For more information circle 162 on Service Coupon Page 16 and mail now.

Standard Type Hose Clamps

Punch-Lok Company's current catalog, just released, contains a compilation of its standard type hose clamps, grooved hose fittings, and special tools and replacement parts. It is also an instruction and training manual.

Separate sections are devoted to detailed coverage of such subjects as Punch-Lok method, uses and applications, and how to apply Punch-Lok clamps. The catalog is illustrated throughout.

For more information circle 163 on Service Coupon Page 16 and mail now.

(Continued on page 240)

HOW USEFUL CAN ONE MACHINE GET?



THE HENRY INDUSTRIAL TRACTOR SHOVEL

brings solid-steel lift arms and powerful cylinders into action on every loading-leveling job. Hoists 2000 lbs.—will bulldoze anything your tractor can budge. Ten attachments available to adapt the Henry perfectly to your needs.

Custom-Built, Work-Tested Attachments . . .



By the makers of the world-famous Henry Hydraulic Backhoe
See your nearest Henry dealer
or write today for free booklet.

HENRY

HYDRAULIC all purpose EARTH MOVERS

MANUFACTURING COMPANY, INC.
1700 North Clay St. Topeka, Kansas

There can be no BETTER than a HENRY

NATIONWIDE SALES and SERVICE

. . . for more details circle 245, page 16



"EASIER LOADING *than any others we tried"*

That's what operator Clarence Grasse says about the Allis-Chalmers TS-260 he operates on a cut-and-fill road job near Waubeka, Wisconsin.

It's the curved bowl bottom and offset cutting edge design that make the TS-260 easier to load. Dirt "boils" through the center of the load, keeps the load live, fills the bowl with 14-yard heaped loads time after time.

On road jobs like this one, the TS-260's short turning radius—a complete turn in only 30 ft—eliminates need for extra travel-to-turn areas, shortens cycle time, gets job done faster, easier.

Maneuverability and full-capacity loading are only two of many advanced-design features that make the TS-260 motor scraper outstanding in performance and dependability. See your Allis-Chalmers dealer for the full story now. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

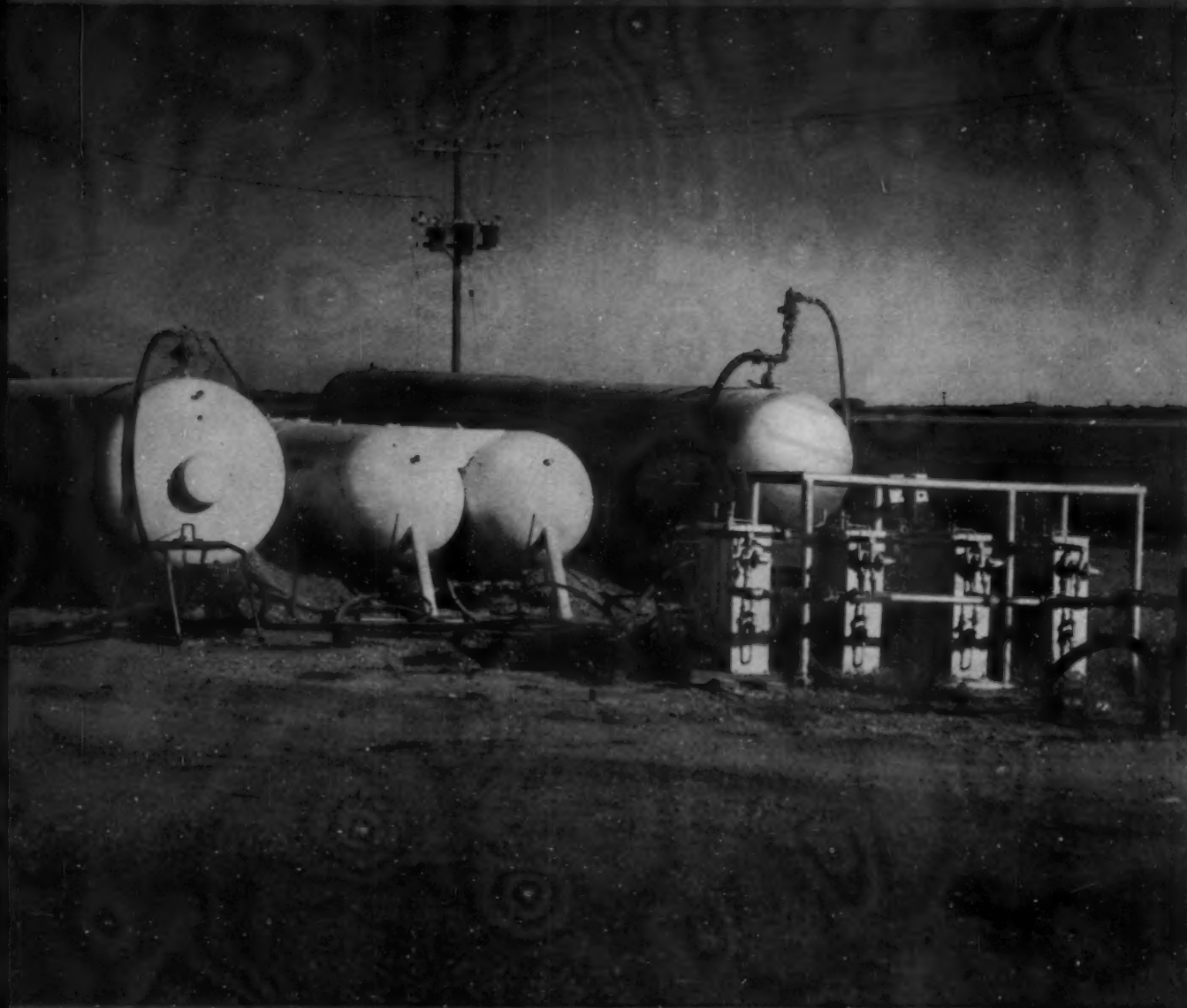
... for more details circle 200, page 16

ALLIS-CHALMERS

Engineering in Action

Bituminous

ROADS AND STREETS



Butane fuel storage facilities, as set up on Kansas Turnpike hot-mix paving project by S. O. Construction Co., of St. Pherson, Kansas. This type of fuel for the dryer and for asphaltic bonding was chosen as being more economical than natural gas which required piping.

Published by Gillette Publishing Company,
22 West Maple Street, Chicago 10, Illinois

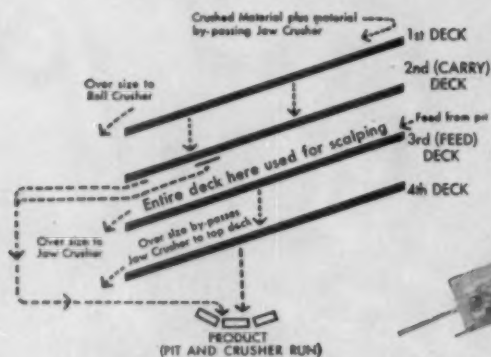
Plant Owners Need More Hot-Mix "Savvy"
Asphalt Engineer Analyzes Kelly Field Failure

APRIL, 1957

**Now you can produce
up to 4 sizes of graded
material at the same time
...from a single plant**

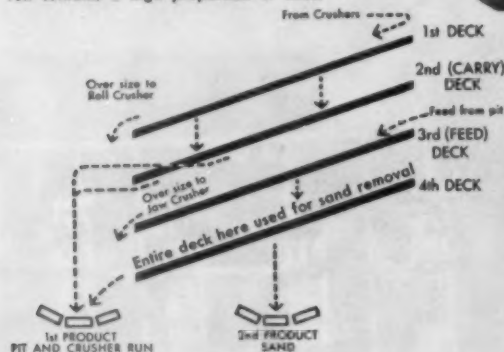
FULL DECK SCALPING CAPACITY

By using a full screen deck for scalping, pit run material that can be handled by the roll crusher is by-passed around jaw. Thus you get full use from each crusher.



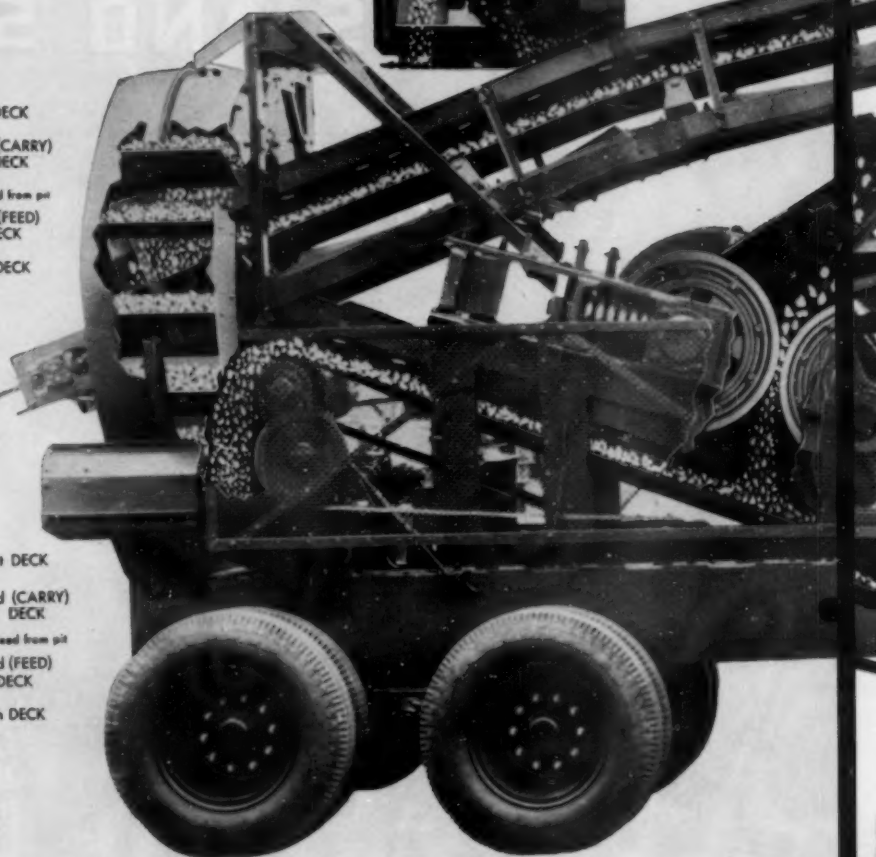
FULL DECK SAND REMOVAL

A full screen deck can be used for sand removal ... a big factor in meeting specifications when pit run contains a high proportion of fines.



TO THIRD (CHIPS)
PRODUCT CONVEYOR

FAR SIDE OF PLANT



New multiple-production plant has king-size 4-deck screen for greater output, flexibility

PRODUCTION INCREASED EVEN MORE BECAUSE SMALLER ROCK BY-PASSES THE JAW CRUSHER

Here's the new king of portable crushing plants... a plant able to turn out 4 different sizes of material at the same time... and with greater capacity than any other portable plant you can buy!

These are strong statements, but field reports on performance of the new PIONEER 44-45 Plant series substantiate every word.

How crusher capacity was increased. These new giant-capacity plants have large capacity units. The 4' x 12' 4-deck vibrating screen is the largest used on any portable plant. The big 1036 jaw crusher and large roll crusher (3024 on the 44V and 4022 on the 45V) give plenty of crushing capacity.

But even more important is the high efficiency of the plant. For example, pit run material which can be handled by the roll crusher may be by-passed around the jaw by using part or all the third deck as a scalping screen.

Thus, jaw and roll crushers can be used 100% for crushing. Furthermore, the operator can equalize the load between crushers by adjusting the jaw setting while plant is in operation.

Even though the nature of pit run varies from time to time, the operator can thus keep each crusher working at full capacity... without even leaving his platform or stopping the plant.

How effective screening area was doubled. Pit run is fed to the third deck and material from crushers is screened on top decks. Because first and second

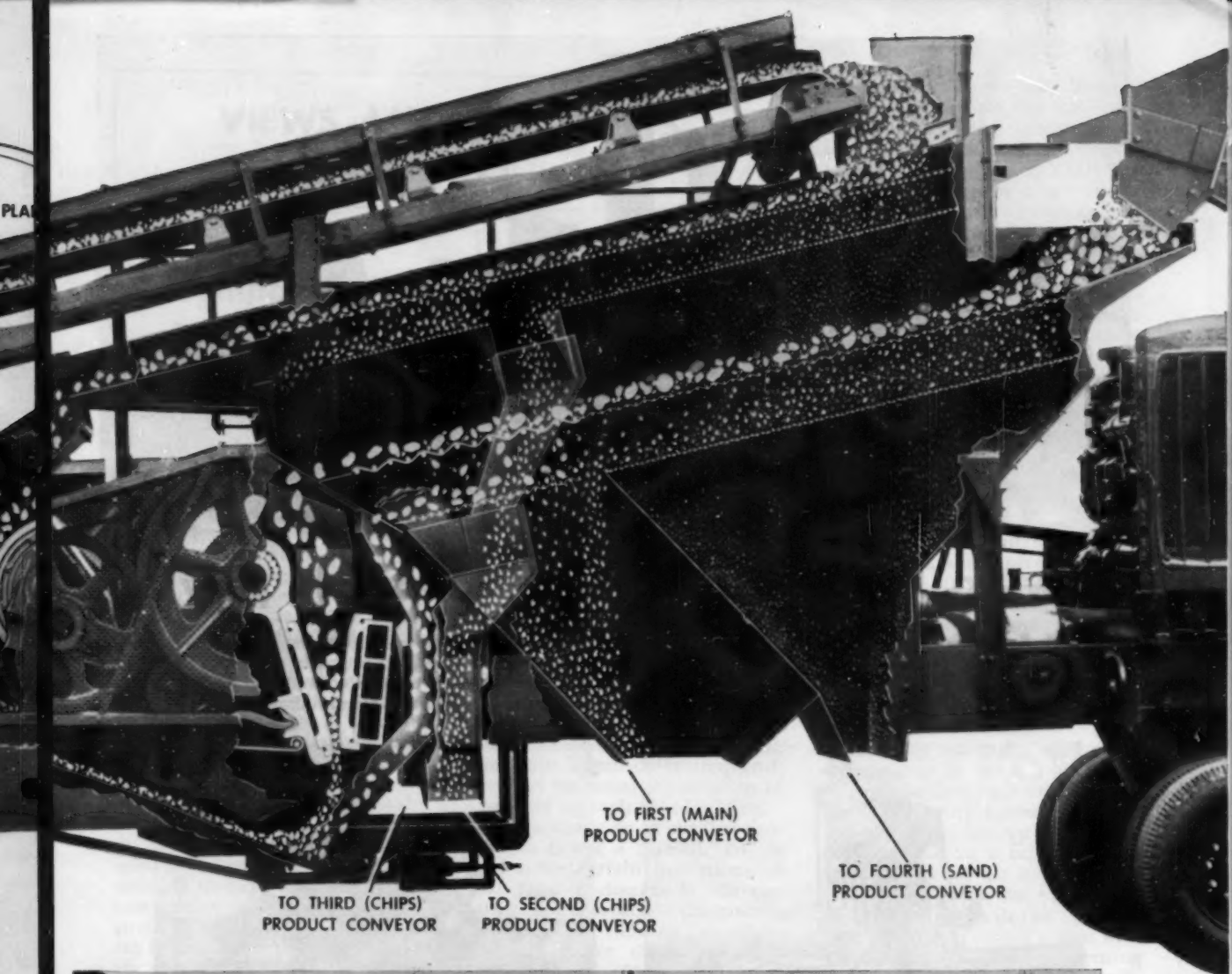
decks are available for sizing material from the crushers, these new plants give double the effective screening area found in any other popular make plant.

A full sand screening deck is provided for quick sand removal if the pit run has a high proportion of fines.

Produces 4 sizes of aggregates at same time. With their 4-deck screen, unique spouting arrangement, and ingenious method of routing material, these PIONEER Plants can produce up to 4 different sizes of material at the same time with close control of gradation.

Actually, 2 different sizes of fractured chips can be produced simultaneously without addition of extra equipment. Further, the chute-and-hopper arrangement makes it easy to either blend crushed material with pit run or remove each product separately.

Nine basic screen set-ups. With 9 basic screen arrangements to choose from, the operator is generally able to meet



the most exacting aggregates specifications regardless of pit conditions.

New screen suspension absorbs vibration. Instead of being mounted rigidly on its base in the usual manner, the big 4-deck screen floats on a dual set of heavy coiled springs mounted at each corner of the main screen frame.

This new and exclusive PIONEER feature avoids transferring vibration to the supporting structure and also increases screening efficiency.

Meets weight, height, width, limits. With an approximate equalizer loading of 34,000 lbs., plants will comply with most highway load limits.

Travel length is only 32'3", width

9'6". Travel height is approximately 13', operating height 14'8".

44 and 45 Series Plants are available with either mechanical or electric drives except that jaw and roll crushers are always mechanically driven.

Typical performance report: Near Yuma, Arizona, Arrow Construction Company's 44V (shown above) is producing road materials at a 435 tph clip. 350 tph consists of 1½" to 3" aggregates for base course, 9 tph of ¾" to No. 10, and 75 tph sand.

Walter Norton, the owner, compares his new 44V with previous plants and reports, "In our opinion the PIONEER 44V is the best portable plant ever built".

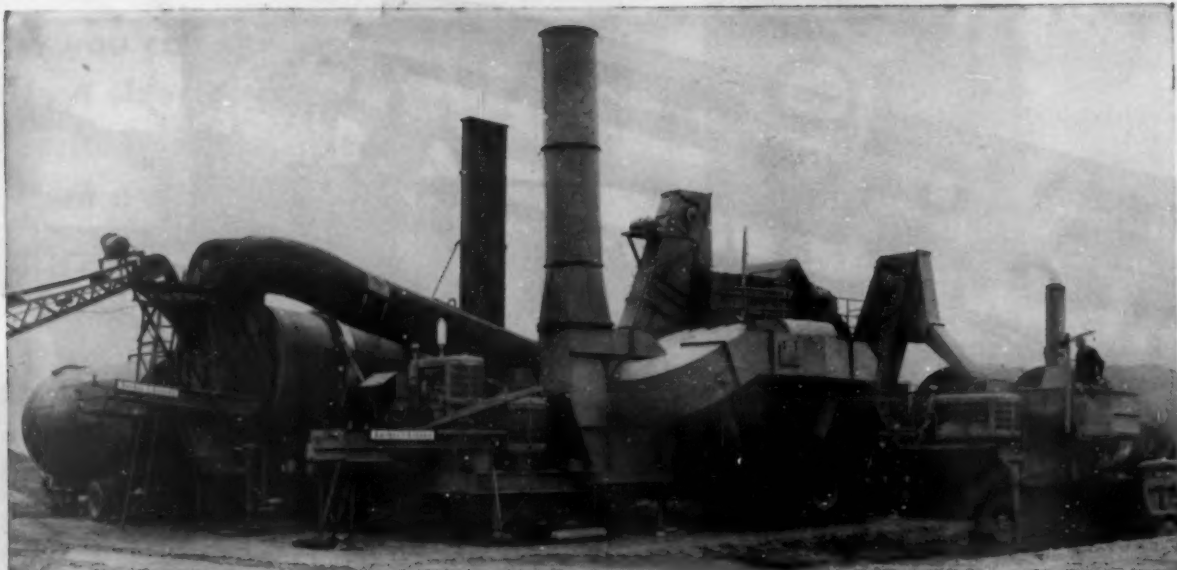
If you, too, wish to lower your cost-per-hour of producing aggregates, it will pay you to see your PIONEER Distributor or write Pioneer Engineering, Division of Poor & Company, Inc., Minneapolis 14, Minnesota.

... for more details circle 261, page 16

Pioneer

ENGINEERING

Division of Poor & Company, Inc.
MINNEAPOLIS 14, MINNESOTA



How to lower the cost of asphalt paving

with Barber-Greene Continuous Plants . . . available in capacities from 20 to more than 200 tons per hour. Built for maximum portability, these plants produce all types of mixes at highest

capacity, and for lowest operating cost. Once the proportions are set, operation is automatic; the human element is eliminated and manpower requirements are reduced to a minimum.



with Barber-Greene Batchomatics . . . available in 2000, 4000 and 6000 pound sizes. Operating on inherently automatic principles, these plants save seconds at every point in the cycle. Instant change-over from automatic operation to manual production of mixes for the drive-in trade . . . instantly reset to preset repetitive cycle operation. New Dyna-Mix pugmill gives faster coating.



with the Barber-Greene Finisher. Having the widest choice of operating speeds, the Barber-Greene Finisher can lay every job at the maximum speed. It provides positive traction, superior maneuverability and unmatched ease of operation. Wide receiving-hopper simplifies truck discharge, eliminates spillage. No other machine paves as permanently, as speedily and as economically.

Write for literature on any plant in the cost-cutting line. Specify capacity.

56-25-AL

Barber-Greene

AURORA, ILLINOIS, U.S.A.



CONVEYORS...LOADERS...DITCHERS...ASPHALT PAVING EQUIPMENT

. . . for more details circle 209, page 16

ROADS AND STREETS, April, 1957

VIEWS AND COMMENTS

By H. G. Nevitt

Compaction—the Neglected Tool

The initial reaction to the above title may be disagreement. In view of the long use of compaction and considerable experience with it, along with the attention it is receiving today, the average engineer may feel that it is far from a neglected tool. This is undoubtedly true in certain phases of road construction—many agencies are making full use of compaction; but we still feel that we can make a good case for our assertion, and will attempt to do so.

Compaction tends to take place under traffic; this greatly strengthens the road structure as a normal result. There is a widespread effort to obtain a certain amount of compaction during all construction today in order to prevent undesirable settlement, roughness, and other difficulties. However, the development of additional pavement strength through greatly increased compaction as a design and construction tool has not been so generally resorted to, particularly by the smaller road building agencies with limited funds and correspondingly greater need of any cheap method to obtain the structural strength needed in their pavements.

For where applicable, compaction is about the cheapest way to build strength into road structures; the increase in bearing power of highly densified soils, bases, and pavements from compaction which does not exceed their critical point is remarkable. Furthermore, this densification can be obtained very cheaply as a result of modern equipment developments—supercompactors, vibrating rollers and other vibrating devices, even pneumatic rollers applying sufficient tire pressures and quantity of rolling. If the materials are suitable, the strength increases may exceed those which can be obtained with much higher quality materials given less compaction. Where such conditions exist, roads which otherwise meet the requirements of modern traffic can have their bearing power

greatly increased through the simple use of additional compaction. In fields where the lowest cost construction must be resorted to—many county and township roads are examples—this additional compactive effect may give some existing roads the required strength.

And the construction of new roads of proper grade, alignment and geometry with relatively thin bases and pavements to the required bearing strength by maximum compactive effort is an obvious approach to the ever present problem of economy. We do not know, but we strongly question whether analysis of the possibilities from this approach is frequently made by the usual organization responsible for such road building.

• We hasten to point out that compaction is not a cure-all. Its use may suffer certain limitations, or may require changes in the construction approach. Compaction beyond the limiting condition weakens rather than strengthens the structure. This condition is normally produced by the void space decreasing to the volume of moisture present. This implies that compaction can only be resorted to up to the point of void saturation, and further densification must await reduction in the moisture present. Or, where this can be controlled, the moisture allowed in the structure must be held down to the critical value even though this results in a greater compactive effort requirement to obtain the desired density. But in many areas these limitations are not severe if intelligent analysis is applied to the problem.

There is also another limitation, which was first called to our attention by Hveem in California. This is the fact that capillary water will enter certain compacted soils or aggregate mixtures, forcing the particles apart until equilibrium is reached between the expansive effect of the moisture and the resistance thereto resulting from the

overburden. Simple tests make it possible to predict this condition and determine the limitations for any given material. Generally speaking, difficulties of this type can be overcome by a subfoundation of selected soils which are susceptible to great compaction, to give load carrying ability and at the same time permit the base to be considerably densified because of the overburden provided and resultant resistance to capillary moisture expansion in the base.

In discussing compaction, attention should be called to the improvements possible in getting high compaction as well as the benefits therefrom. Supercompactors, for example, will not merely make possible a higher density but in addition can achieve this with far fewer passes. In suitable soils vibration likewise permits rapid attainment of the desired end—although for any soil the relative effects of vibration and high tire pressure pneumatic rolling will differ, and the proper approach to rapid compaction therefore must be decided on the basis of the specific conditions present.

Summing up, many road structures currently in use, or being constructed, can have their bearing power markedly increased by the use of compaction up to limiting conditions. This is being done on many jobs, but we believe there will be agreement that exploration of the possibilities in this respect is rarely a routine part of design with many agencies. Merely getting some percentage of the density based on a standardized laboratory test or similar, is an operation which is far from meeting the needs for exploration of the possibilities from compaction. This latter should be a basic part of the design just as much as a review of the various available materials. It is certainly a cheap approach when usable. We believe that the fullest possible attention must be given to this subject if the engineer is to meet his duty of providing the most roads for the least money.

Missouri Plans State-Wide Highway Oiling Program

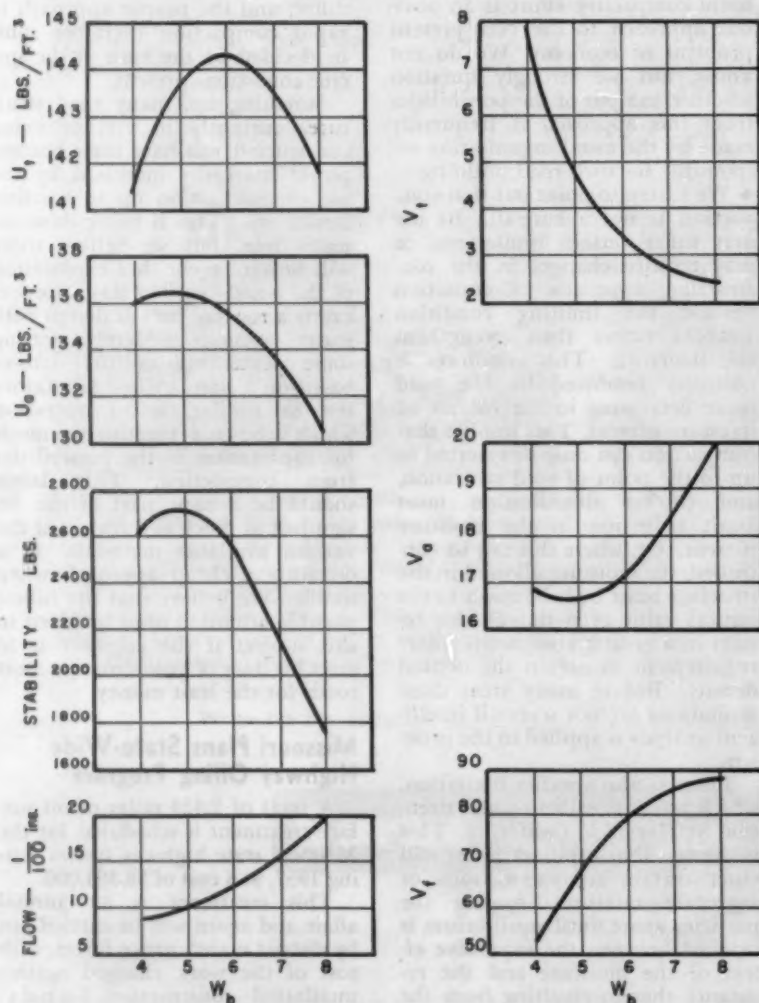
A total of 2,424 miles of oil surface treatment is scheduled for the Missouri state highway system during 1957, at a cost of \$3,394,000.

This treatment is an annual affair and again will be carried out by district maintenance forces, with cost of the work charged against unallotted construction funds.

Plant Owners Need More "Savvy" on

Hot Mix Design and Control

A better understanding of such procedures as the Marshall test is a "must" for bituminous concrete producers if they are to know how to meet today's close specifications and protect their profit margins.



The importance of a better understanding by hot-mix contractors of the ins and outs of mix design and control was spotlighted and explained in a paper by S. B. Hudson & W. B. Warden of Miller-Warden Associates, Consultants. The paper was presented at the 2nd Annual Convention of the National Bituminous Concrete Association, Chicago, February 1-2, 1957.

Excerpts are given with permission of the authors and of the association. The complete paper will be included in the association's proceedings. For further details write H. K. Griffith, executive secretary, at 1145 19th St., Washington 6, D.C.

The first part of the paper, here omitted, covers the history of the Marshall test's development, the apparatus required, and the test and design procedures of this widely used method.

The mix-design method consists of five steps: selection of gradation; making specimens of mix using the chosen gradation and various asphalt contents (under standardized conditions); testing specimens for bulk specific gravity, stability and flow; computing and plotting test values; and applying criteria and selecting optimum asphalt content.

This review will be limited to the computation and plotting or

● Figure A. Typical curves of physical properties of asphalt concrete vs. percent asphalt content by weight. (Miller Warden Associates)

"what's done" with the test data, and selecting of optimum asphalt content. It gives an example illustrating how sensitively the contractor's profit interest is often involved in meeting specification details on air voids, voids in aggregate and percent voids filled with asphalt in the mix.

Computations start with converting dial readings into pounds by means of a calibration chart for the proving ring used. These values are then corrected for specimen size, and the result in pounds is expressed as the Marshall stability. Results of all specimens of the same asphalt content are averaged to obtain a mean value.

Bulk specific gravity values for all specimens of the same asphalt content are averaged and the mean value multiplied by 62.4 to obtain the average unit weight total mix (U_t —see table of symbols) in lb/cu. ft.

Flow readings are similarly averaged to obtain a mean value for each asphalt content.

Graphical curves are prepared on rectangular coordinate plotting bulk specific gravity unit weight, stability, and flow against asphalt content. Smooth curves are then drawn through the plotted points. The shape of typical curves is shown in Fig. A.

With the basic Marshall method, the optimum asphalt content is next read directly from the graph as that asphalt percentage corresponding to the maximum on the unit weight curve (U_t). The mix is considered satisfactory if certain requirements are met as to minimum stability, maximum flow and recommended limits of density (S_t) at this asphalt content.

For the method of design devel-

oped by the Corps of Engineers, it is necessary to select density values from the smooth curve drawn through the plotted points, and to use these values to compute the

percent total air voids in the mix (V_t) and the percent aggregate voids filled with asphalt (V_a). These values are also plotted against asphalt content. The weight and volume relationships in the mix and formulae for computing the required values are shown in Fig. B. (The symbols used in Figs. A and B are listed in Table II).

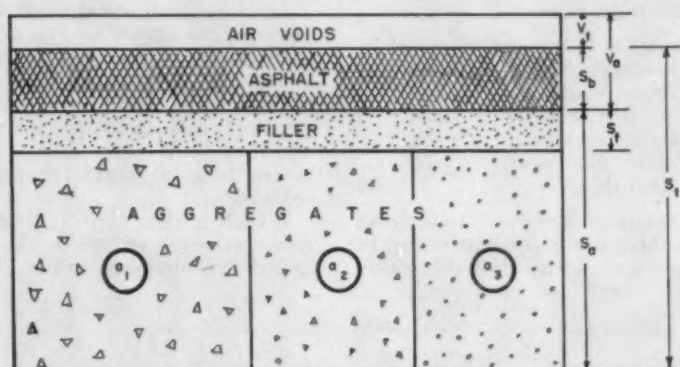
Optimum asphalt content of the mix is found by averaging the values of asphalt content which give: maximum stability; maximum unit weight (U_t); 4 percent voids (V_t) in mix; and 80 percent voids filled with asphalt (V_a) in mix.

The mean value of asphalt content should produce values of stability, flow, voids (V_t), and voids filled (V_a) within the limits of the criteria.

The current criteria for surface mixes which will be subjected to rubber-tired traffic having inflation

(Continued on page 212)

VOLUME RELATIONS IN ASPHALT PAVING MIXTURES



FORMULAS FOR WEIGHT AND VOLUME RELATIONS

	SPECIFIC GRAVITY	UNIT WEIGHT LBS PER CU FT	PERCENT SOLIDS BY VOLUME	PERCENT VOIDS BY VOLUME	
Total Mix	G_m	$U_t = 62.4 G_m$	$S_t = 100 \frac{G_m}{G_t}$	$V_t = 100 - S_t = 100 \frac{G_t - G_m}{G_t}$	
Aggregate Only	-	$U_a = U_t \times \frac{100 - S_b}{100}$	$S_a = S_t - S_b$	$V_a = 100 - S_a = V_t + S_b$	
Asphalt Cement	G_b	-	$S_b = \frac{G_b P_b}{G_b}$	-	
Filled with Asphalt -	-	-	-	$V_f = 100 \frac{S_b}{V_a} = 100 \frac{S_b}{S_b + V_t}$	
Theoretical Max.	$G_t = \frac{100}{S_t} = \frac{100}{S_a + S_b} = \frac{100}{\frac{W_1}{G_1} + \frac{W_2}{G_2} + \frac{W_3}{G_3} + \frac{W_r}{G_r} + \frac{W_b}{G_b}}$				
F/B ratio	$\frac{S_t}{S_b} = \frac{W_r G_b}{W_b G_r}$				

● Figure B. Volume relations in asphalt paving mixtures. Some of the "essential mathematics" involved in using the Marshall method. (Miller-Warden Associates)

Table I. Typical Statistical Summary of Tests on Field Laboratory Prepared Briquets

	Lb. Per Cu. Ft.		Marshall Stability	
	Crushed Stone Mix	Slag Mix	Crushed Stone Mix	Slag Mix
Number of Tests (n)	50	50	50	50
Average (X)	150.85	139.53	1264	1402
Standard Deviation (S)	0.77	0.67	140	194
Range (R)	3.00	3.19	668	880
Coefficient of Variation (v)	0.51	0.48	11.1	13.7
95% Upper Confidence Limit	151.1	139.7	1304	1456
95% Lower Confidence Limit	150.6	139.3	1224	1346
No. Samples for 0.5 Tolerance	10	7		
No. Samples for 1.0 Tolerance	3	2		
No. Samples for 2.0 Tolerance	1	1		
No. Samples for 10% Tolerance			5	8
Material within 10% of (X)			63	53

pressures of 100 psi or less and based on apparent specific gravity computations are:

Stability ..Not less than 500 lb.
FlowNot more than 20
Percent voids
total mix (V_t) 3-5
Percent aggregate
voids filled with
asphalt (V_a)75-85

Examination of the criteria shows that there is an apparent spread of 10 percent in the allowable value

of voids filled with asphalt (V_a) and 2 percent spread in the allowable value of the total voids (V_t). However, as shown by Fig. C, this is true only when the aggregate voidage (V_a) of the gradation used is 20 percent, and it becomes increasingly difficult to meet the voids and voids filled requirements simultaneously as aggregate voidage is reduced.

If such criteria form part of the specifications and are to be enforced, it is obviously to the advan-



S. B. Hudson, co-author; Miller-Warden Associates

"Our Etnyre 'Black-Toppers' and Hauling Tanks keep us sold"



Two of 22 Etnyre units operated by Central Asphalt Inc., New Hartford, New York. A 1250 FX 400 Style D "Black-Topper" is shown loading 350-degree bituminous material from an Etnyre Hauling Tank equipped with low-pressure burners.

Recently adding two new Etnyre "Black-Topper" Distributors and a new Etnyre Hauling Tank to bring their fleet up to 14 distributors and 5 transports, Central Asphalt Inc. says, "The fine performance and dependability of the units we are operating keep us sold on Etnyre equipment."

Central Asphalt has used Etnyre "Black-Topper" Distributors and Load-Topper Hauling Tanks extensively in the application of all types of bituminous materials throughout their 11 years of successful operation in central, southern, and southwestern New York State.

Etnyre tanks are originally and exclusively designed and made for handling "heavy" materials. Over and over again, the superiority of these tanks in the special service for which they are designed has been proved by substantial users like Central Asphalt. Learn the details *before* you buy another unit! Call your Etnyre dealer or write E. D. Etnyre & Co., Oregon, Illinois, U.S.A.

SEE YOUR ETNYRE DEALER

ETNYRE
"Black-Topper"
BITUMINOUS DISTRIBUTORS



... for more details circle 233, page 16

tage of both the engineer and producer to attempt to establish, during the design phase, a combination and gradation of aggregate which will insure adequate aggregate voidage (V_a). Twenty percent V_a is usually somewhat outside the aggregate voidage afforded by conventional gradations, but it is advisable to have a value of V_a of at least 17 percent in specimens representing the job mix formula. This affords sufficient flexibility to avoid the situation where the mix is "out of specs" a large portion of the time and also insures that there will be sufficient "room" in the mix for enough asphalt to provide durability.

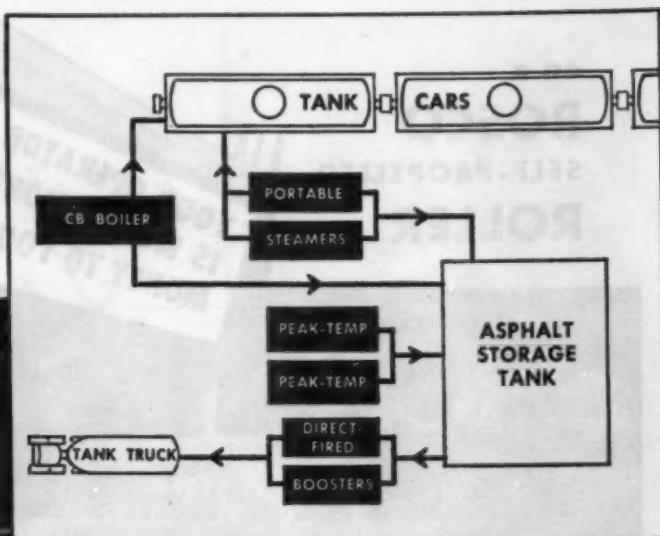
Aggregate voidage may be increased slightly by reducing filler content. However, in the interest of an acceptable filler-bitumen ratio, major adjustments must be made by changes in the aggregate gradation with respect to the maximum density curve of the particular maximum size of aggregate involved.

The original tests were made by the Corps of Engineers on relatively non-absorbent aggregate and all computations and criteria were based on apparent specific gravity. In the case of absorbent aggregates, serious errors are introduced into void computations by the use of apparent specific gravity values for aggregates. One method of computation of voids in mixes containing absorptive aggregate is by the use of bituminous impregnated specific gravity. However different criteria are applied when these values are used.

The application of the Marshall method (or one of the other methods) to job mix design and control

(Continued on page 214)

**Receiving
and
distributing...**



7 Cleaver-Brooks heating units assure asphalt temperature control!

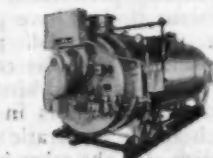


Plant handles as much as 150,000 gallons of asphalt daily.

Asphalt Products Co. is a model of a high-efficiency rail-land terminal.

Asphalt Products Company, Stevens Point, Wis., enjoys an excellent reputation for providing prompt, efficient delivery to its many customers in this territory. One of the largest rail-land asphalt terminals, it's ideally geared to serve adjacent county highway departments, municipalities, contractors and others with asphalt products.

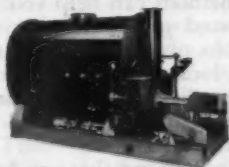
The sketch above shows how their seven Cleaver-Brooks units are employed in controlling temperatures of asphalt. Asphalt in tank cars is first heated by steam from the 150-hp CB boiler, combined with steam from the two Cleaver-Brooks Portable Steamers. In storage, the asphalt is heated with steam from the CB boiler, Peak-Temp and Direct-fired Boosters for transfer to tank trucks.



CB BOILER — 15 to 200 hp. Oil, gas or combination oil/gas fired.



PORTABLE STEAMER — 50 to 125 hp, trailer and skid-mounted.



PEAK-TEMP OIL BOOSTER — Skid-mounted. Easily transported.



PORTABLE PUMPING BOOSTER — Has self-contained oil and gas tanks.

Illustrated at left is the heat-transfer equipment at work in this 100% Cleaver-Brooks installation. Selection and planning details were the direct result of cooperative efforts of Cleaver-Brooks field engineers and Asphalt Products Company. Assistance like this is available to you without obligation.

Write: Cleaver-Brooks Company, Dept. D, 395 E. Keefe Ave., Milwaukee 12, Wisconsin.

Cleaver Brooks

ORIGINATORS OF THE SELF-CONTAINED BOILER

... for more details circle 223, page 16

ROADS AND STREETS, April, 1957

on a
ROSCO
SELF-PROPELLED
ROLLER



YOUR OPERATOR will earn more money for you with Rosco's Model SR-9-0 nine wheel self-propelled, pneumatic tired roller. Here are some of the features that make this machine a real money-maker:

The operator's seat is located for all-around visibility and close operations without "blind spots". Heavy duty, automotive hydraulic power steering reduces operator fatigue...allows more concentration on the job. Ample power for all operating conditions from a heavy duty 4 cylinder, high torque gasoline or diesel engine... multiple speeds forward and reverse... high "over-the-road" travel speeds for fast changes to new job locations.

Rosco's large capacity body is designed for maximum ballast load for proper compaction. Special smooth tread tires provide an evenly rolled path of 69" with overlap. The short wheelbase permits a close turning radius. Drive is through heavy duty, high tensile roller chains and steel sprockets. These are enclosed and running in oil.

This modern, smooth operating SR-9-0 Roller in the hands of your operator will make more profit for you. Ask your Rosco dealer for a demonstration now or write for Bulletin 560B. It contains all specifications and information you'll want to know about Model SR-9-0.



ROSCO BITUMINOUS DISTRIBUTOR with Pressure Metering.
Front or rear mounted for truck or trailer.

Rosco
MINNEAPOLIS

THE BEST FOR BETTER ROADS

3118 SNELLING AVENUE • MINNEAPOLIS 6, MINN.

DISTRIBUTORS • MAINTAINERS • ROLLERS

SUPPLY TANKS • TAR KETTLES • ROAD SWEEPERS • STREET FLUSHERS

... for more details circle 287, page 16

HOT MIX DESIGN

(Continued from page 212)

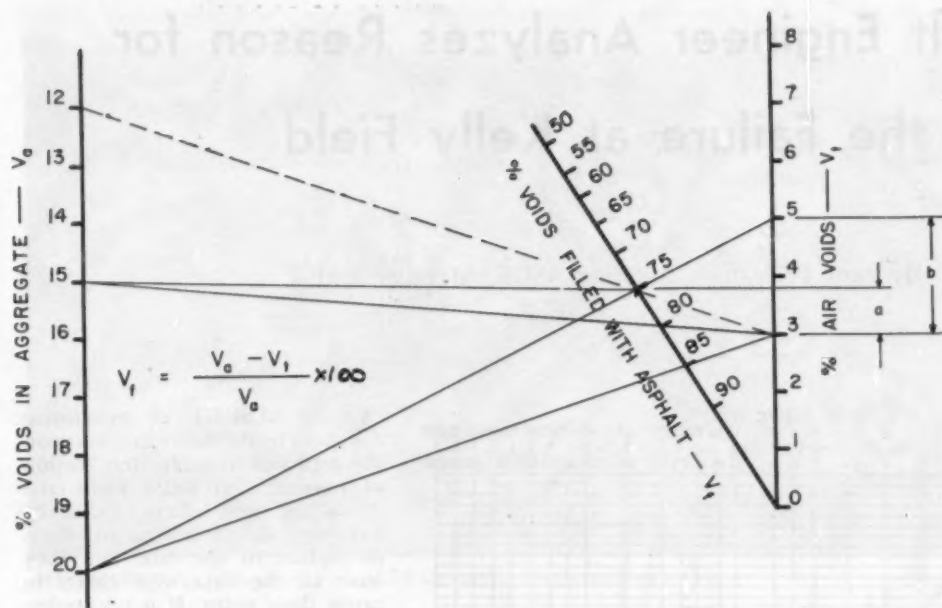
of hot mix bituminous concrete means a great deal to the producer. Some good—some "bad," but a realistic consideration and appreciation of all of the facts will reveal that the producer as well as the industry has much to gain when and if these methods are properly and intelligently applied.

The need for maintaining and continually improving quality standards for flexible pavement design and control has been and will be discussed by others. Higher wheel loads and traffic count is now imposing and will continue to impose a responsibility on public agency, engineer, contractor and producer alike to learn and to use the best of all the tools available. These design methods are your tools as well as the engineer's. But we will not labor these points here, important as they are.

Rather let us take briefly a cold practical look at a few of the ways that these design and control methods may affect the producer's pocketbook now—this season, and next year, and the next. First, let's recognize their presence. A recent survey showed that 42 out of 49 agencies reporting use stability tests in designing bituminous concrete mixes. Of these, 20 use Marshall as their primary method and 5 more use Marshall in one form or another as a supplement to other methods. Of course the Corps of Engineers has used Marshall for some time on airfield pavement and is continually working to improve this method for both design and control. So it's here, and in our opinion these or similar methods will continue to grow in usage.

Some producers may initially be hurt by restricted production and more rejections if they have poor control of the cold feed, poor screening efficiency, excessive carry-over, improperly balanced bins, or many of the other factors in the plant which result in erratic and variable mixes. On the other hand the proper and intelligent use of these methods can help you attain a balanced plant with less waste, fewer bin overflows, better utilization of local sands and aggregates, and a steadier, more stable, production of higher quality and more uniform mix.

We recommend that you become familiar with and use these methods



● Figure C. Relationship of air voids — voids in aggregate, and percent voids filled with asphalt in all bituminous mixes. (Miller-Warden Associates)

yourselves to adjust your gradations within the specification bands to yield the optimum results for quality, economy and trouble-free operation of your particular plant.

Unfortunately there are too many inspectors and field technicians who are not as yet well enough informed to fully appreciate the economics of hot mix plant operation, or worse, they do not care about costs. Therefore you, as producers, should know how to use these tools to protect your own interests. To illustrate, refer again to Fig. C. It is perfectly possible to have a gradation within the specifications which is so close to the maximum density curve that the aggregate voidage (V_a) is insufficient to permit practical tolerances for the air voids (V_t) and the percent voids filled (V_f) criteria at the same time. This has happened to the producers' discomfort. You should be well enough informed yourselves or know when and how to get the proper technical help to most economically adjust the gradation in your plant to give the best chance for trouble-free and steady production.

Finally, we would like to emphasize the practical application of these methods of mix design to the greater utilization of local materials. In some parts of the country our supply of prime aggregates and sands is woefully limited and transportation costs are high. As the accelerated road program takes its toll, this condition will become worse. There is, therefore, a strong incentive to use local materials to best advantage.

It should be obvious that there is an opportunity here for the hot-mix producer to increase volume and profits by using the Marshall

or other modern design method, by creating low cost mixes which can compete with conventional construction of lower quality.

Table II—Definitions of Symbols Used in Figures

a, b, A, B, etc. - values used in various formulas

F/B - ratio of filler to bitumen by volume (S_b / S_f) in a paving mixture

G₁, G₂, etc. - specific gravities of aggregate fractions of a paving mixture

G_a - weighed average specific gravity of aggregate-filler blend used in paving mixture

G_b - specific gravity of asphalt cement

G_f - specific gravity of minus 200 mesh material in a paving mixture

G_m - bulk specific gravity of molded or cored specimen

G_t - theoretical maximum specific gravity of total mix

S_a - per cent solids of aggregate only in a paving mixture

S_b - per cent by volume of asphalt cement

S_f - per cent by volume of minus 200 mesh material in a paving mixture

S_t - per cent solids in the total mix

U_a - unit weight of aggregate only in a paving mixture

U_t - unit weight of total mix

V_a - per cent voids in aggregate only in a paving mixture

V_f - per cent voids filled with asphalt

V_t - per cent voids in the total mix

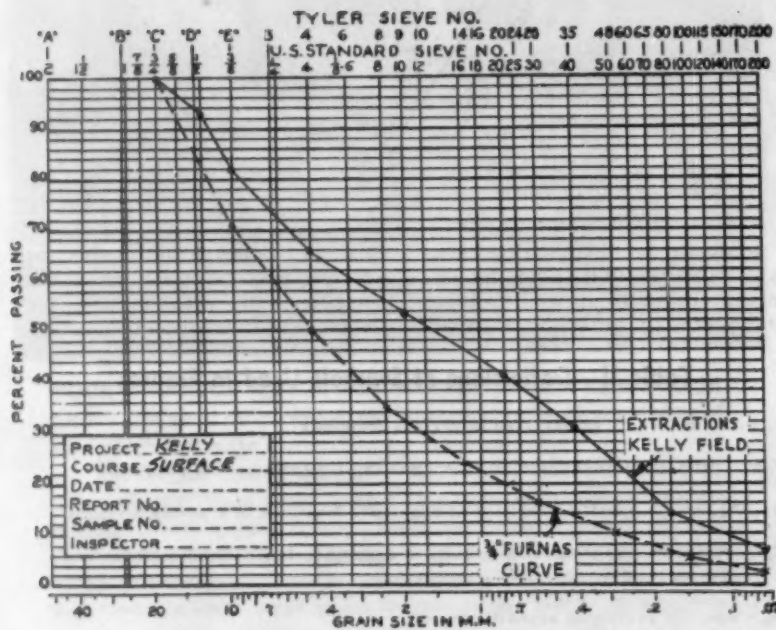
W₁, W₂, etc. - percentage weights of respective aggregates in a paving mixture

W_b - per cent by weight of asphalt cement in a paving mixture

W_f - per cent by weight of minus 200 mesh material in a paving mixture

Asphalt Engineer Analyzes Reason for the Failure at Kelly Field

By PAUL E. BLOUIN, Member ASCE; Member AAPT



AS A RESULT of exhaustive tests by the Army Engineers on the asphaltic concrete test section of pavement at Kelly Field, the Army Engineers inform us that the pavement failed due to an excess of asphalt in the mix, and they have all the data with charts to prove their point. It is my understanding that as a result of their findings they propose to decrease the asphalt content in mixes by 20 percent.

Gradation of the surface mix on the Kelly test section as determined from core extractions is shown on Plate No. 1. Also shown is a Furnas maximum density curve for 3/4-in. top size aggregate. It would be impossible to obtain good stability (Continued on page 220)

● Figure 1. Gradation curve for extractions from the test pavement in relation to the "Furnas Curve" for the 3/4-in. material.

Table A. Optimum Density Grading by C. C. Furnas
Total Per Cent Passing Square Opening Sieves for Various Maximum Sizes

Sieve Size	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#3	#4	#6	#8
2"	100.0									
1 1/2"	84.9	100.0								
1"	72.0	84.8	100.0							
3/4"	61.0	71.8	84.7	100.0						
1/2"	51.6	60.7	71.6	84.6	100.0					
3/8"	43.5	51.2	60.4	71.4	84.4	100.0				
#3	36.6	43.1	50.9	60.1	71.0	84.2	100.0			
#4	30.8	36.2	42.7	50.4	59.6	70.7	84.0	100.0		
#6	25.7	30.3	35.7	42.2	49.9	59.1	70.2	83.4	100.0	
#8	21.4	25.2	29.7	35.1	41.6	49.3	59.5	69.7	83.3	100.0
#12	17.7	20.9	24.6	29.1	34.4	40.8	48.4	57.7	69.0	82.8
#16	14.6	17.2	20.3	24.0	28.4	33.6	39.9	47.6	56.9	68.3
#20	11.9	14.1	16.6	19.6	23.2	27.4	32.6	38.8	46.4	55.7
#30	9.6	11.3	13.4	15.8	18.7	22.2	26.3	31.3	37.5	45.0
#40	7.7	9.0	10.7	12.6	14.9	17.7	21.0	25.0	29.9	35.8
#50	6.0	7.1	8.4	9.9	11.7	13.9	16.5	19.6	23.4	28.1
#70	4.6	5.4	6.3	7.5	8.9	10.5	12.5	14.9	17.8	21.3
#100	3.3	3.9	4.6	5.5	6.5	7.7	9.1	10.9	13.0	15.6
#140	2.3	2.7	3.2	3.8	4.5	5.3	6.3	7.5	9.0	10.8
#200	1.4	1.7	2.0	2.3	2.8	3.3	3.9	4.6	5.5	6.6



TANDEM SPREADING of the Asphaltic Concrete speeded the resurfacing work as . . .

Bitumuls and Asphalt Put New Life in Famous Ridge Route on U. S. Highway 99

IN JUNE OF 1956, a contract for one of the largest resurfacing jobs to date was let by the State of California Division of Highways. This contract called for more than half a million dollars of resurfacing on a 41 mile stretch of the Ridge Route (U.S. Highway 99) between Los Angeles and the Kern County Line.

Because various types of existing pavements were involved in this project, the requirements for asphalts and Bitumuls to be used in the resurfacing operations were quite complex. For instance, the job called for 21 miles of multi-lane Asphaltic Concrete resurfacing; 13 miles of sub-sealing, crack-sealing, and priming of old rigid-type pavements ahead of resurfacing; 8 miles of sealing and priming of existing bituminous 4-lane roadway; and extensive shoulder work.

To meet these requirements, the quantities of asphalt and Bitumuls required are impressive; for sub-sealing, 1,700 tons of Grade 10-25 Air Refined Asphalt; for resurfacing, 3,500 tons of 200-300 Penetration Paving Asphalt; for seal and prime work, 140,000 gallons of Bitumuls.

Timing and coordination vital

Successful bidder on the job was Schroeder & Co., Sun Valley, California. Completion of the work was scheduled for January 1957, so speed was essential. Also, close coordination was required between the Engineers on the job and the Field Representatives of American Bitumuls & Asphalt Co. (supplier of all bituminous materials) to assure accurate timing and delivery of specific types and quantities of these materials.

On the old rigid-type pavements,

slabs were drilled and sub-sealed with Air Refined Asphalt. Cracks and joints were filled and sealed.

Asphaltic Concrete (Paving Asphalt mixed with $\frac{1}{2}$ inch to $\frac{3}{4}$ inch maximum-size aggregate) was plant mixed and trucked onto the job where it was spread in two lifts, to provide a uniform 3 inch thickness. Using two spreaders equipped with special shoulder extensions, this mix was placed to a full width of 37 feet in a single pass.

The existing bituminous pavement required only a 1 inch overlay of Asphaltic Concrete, as opposed to 3 inches specified over the rigid-type section. Ahead of the placement of this 1 inch thickness, Bitumuls Slurry Seal was used to seal and prime the old surface.

All asphalts from a single source

This job, because of its unusual size and many complexities, provides an excellent example of the ability of American Bitumuls & Asphalt Co. to deliver a full line of asphaltic products to meet every need; and to furnish the on-job field-service that can often mean the difference between profit and loss. Whether your next project is a resurfacing operation or new construction, check with our office nearest you for all your asphalt requirements.



BITUMULS SLURRY SEALING ahead of resurfacing on the existing bituminous roadway.

. . . for more details circle 202, page 16

ROADS AND STREETS, April, 1957



**American Bitumuls
& Asphalt Company**
200 Bush Street
San Francisco 20, Calif.

Coming VERY SOON!



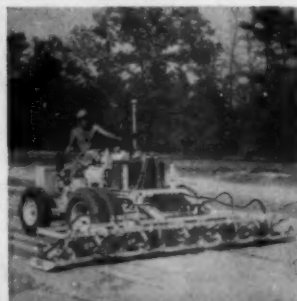
A FAR MORE POWERFUL, FASTER AND EFFICIENT JACKSON VIBRATORY COMPACTOR

Combines all the versatility and wide adaptability features* that contributed to making the present JACKSON VIBRATORY COMPACTOR the predominant compacting medium on nearly all major paving projects! By all means get the complete facts concerning this new machine before making any commitments! Write today for literature which will soon be available!

There are more Jackson Vibratory Compactors in use than all other makes of pan-type compactors combined.

JACKSON VIBRATORS, INC.
LUDINGTON MICHIGAN

* ADAPTABILITY FEATURES OF PRESENT JACKSON COMPACTOR WHICH WILL ALSO CHARACTERIZE THE NEW MACHINE.



8 COMPACTING UNITS in work-head for maximum coverage.



2 COMPACTING UNITS in twin hook-up self-propelling. One man readily compacts up to 4,000 sq. ft. per hour in 10" layers.



1 COMPACTING UNIT fitted with operating handle and narrow base. Just right for the otherwise unreachable spots.



3 COMPACTING UNITS in tandem and staggered. One of many hook-ups to exactly suit conditions.



4 COMPACTING UNITS just fit this widening job. Change required only a few minutes.

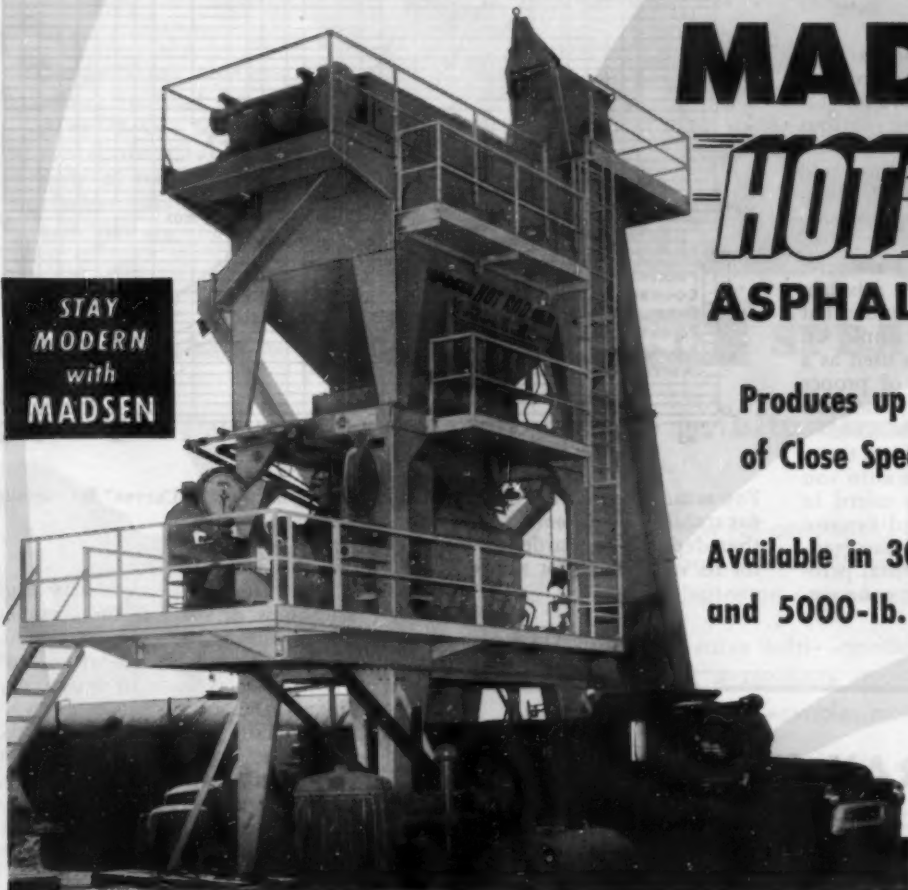
Specially Designed
for Today's Fast Moving
ROAD BUILDING PROGRAM... **the NEW**

MADSEN HOT-ROD ASPHALT PLANT

STAY
MODERN
with
MADSEN

Produces up to 250 T.P.H.
of Close Specification Mixes

Available in 3000-lb., 4000-lb.
and 5000-lb. Batch Capacities



Whether you are a contractor who likes to move or the "get-set-and-stay-there" type of operator... the new MADSEN Model 391 HOT ROD Asphalt Plant is designed for you! This plant is extremely versatile... capable of delivering maximum daily tonnage of top grade bituminous mix under today's exacting specifications. The HOT ROD has a minimum of removable parts for trans-

port and sets up quickly. It is streamlined in design, has no "excess baggage", and it is one of the easiest-to-operate asphalt plants in the industry. Some of the outstanding features of this new MADSEN Model 391 HOT ROD Asphalt Plant are shown below... check them—then ask your MADSEN Distributor for complete details and engineering specifications.

- New fully-enclosed (running in oil) gear box reduction unit that goes right to the mixer shafts... eliminates exposed mixer timing gears.
- Famous MADSEN Twin-Shaft Pug Mill Mixer (Patented) with externally removable sectional liners, improved mixing action and faster discharge.
- Simplest, cleanest design in the industry... with a minimum of removable parts for easy transport and fast set-up.

- MADSEN Asphalt Pressure Injection System with new rotating distribution bar (Patented)... injects the asphalt into the mill quickly—cuts it off sharply to give you improved mixing and reduced mixing time.
- Operator station on end of plant... with swivel-head asphalt and aggregate scales and all controls conveniently located for easy fatigue-lessening plant operation.
- Fast air operation of bin gates, asphalt pressure injection system and mixer gate.
- Exclusive bin design (Patent Pending) eliminates segregation.



Equipment that Serves

THE MADSEN LINE OF PRODUCTS
FOR THE ASPHALT PAVING INDUSTRY
INCLUDES

ASPHALT PAVING PLANTS • PUG MILL MIXERS • AGGREGATE DRYERS • DUST COLLECTOR UNITS
ROAD PUG TRAVEL-MIX PLANTS • WEIGH BATCHERS • SUPER FLOAT AND JOHNSON FLOAT FINISHERS
ASPHALT TANKS • ROYAL CROWN PUMP VALVES • ASPHALT AND FUEL PUMP UNITS

Ask your MADSEN Distributor for Catalog No. 391, or write MADSEN WORKS,
Baldwin-Lima-Hamilton Corporation, P. O. Box 36, La Mirada, California



MADSEN WORKS
BALDWIN-LIMA-HAMILTON
CONSTRUCTION EQUIPMENT DIVISION
DIVISIONS: Austin-Western • Eddystone •
Electronics & Instrumentation • Hamilton •
Lima • Loewy-Hydropress • Madsen • Pelton
• Standard Steel Works

... for more details circle 271, page 16
ROADS AND STREETS, April, 1957

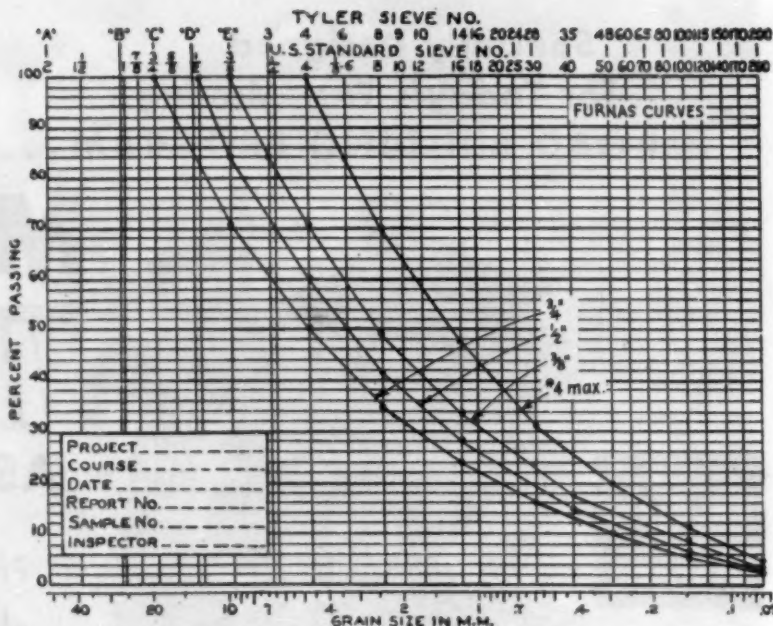
KELLY FIELD FAILURE

(Continued from page 216)

from a mix graded that far removed from a Furnas curve, particularly if the mix contains aggregates of rounded particles.

Many years ago Furnas conducted some extensive tests at M.I.T. to determine gradation for maximum density using various maximum size aggregates. The results of his findings are illustrated on Table A and Plate No. 2. Maximum density means proper gradation of all particles.

Everyone has noticed, I am sure, the variations of sands on a beach. You find some beach sands that pack very firmly. For example, on some beaches the sand is used as a race track; this is sand of proper gradation. On the other hand, you find many beach sands that have no supporting value at all, if you try to drive on them with your auto you would become hopelessly mired in the soft sand. That is the difference between proper and improper gradation. The same fundamental principle applies to asphaltic concrete.



You must have stability of aggregate for stability of pavement. Any mix that depends on hardened asphalt for its stability is not a mix fit for use.

Figure 2. "Furnas Curves" for various aggregate fractions.

It is true that angularity and roughness of surfaces on particles can overcome a good many instances of improper gradation, but what reason is there to design any mix with a poor gradation? If you need maximum stability the mix should be designed as close to a Furnas curve as possible. Therefore, a mix to withstand heavy channelized traffic should have proper gradation as well as angular or rough surfaced particles.

It is not necessary, either, to use 3/4-in. stone in a surface course mix. Either 1/2-in. or 3/8-in. maximum size stone permits a much improved textured surface. A surface mix designed around the 1/2 or 3/8-in. Furnas curve with some slight deviation on the 20 mesh or 40 mesh sieve to provide the desired amount of voids, would give a first class surface meeting best criteria requirements and for added stability would need correct shape of particles.

The surface mix at Kelly Field shows approximately 50 percent passing No. 10 mesh. It also contained 5 percent asphalt. The claim was made that the cause of the failure was excess asphalt; however, if you compute surface area of particles you will find that 5 percent asphalt is not enough asphalt to properly coat all particles in this mix. In my opinion, and I am firm-

(Continued on page 222)

SPRAY IT RIGHT

Yes. "Right From
your shipping
drum" . . . with a
TARCO SPRAYER



Materials Sprayed: Bituminous Binders . . . asphalt emulsions, light tars and cutbacks. **Weed Killers.** Insecticides. **Waterproofing materials** including silicone products. **Cleaning Solutions.** **Paints** . . . oil and water base.

Fast and Convenient: You can change barrels in 5 minutes . . . 20 to 30 barrels daily. Clean all lines in 3 minutes. You can plan your work and do it at your convenience with your own help . . . simple to operate. Easy to service.

Four Models: . . . with a gasoline engine driven air compressor or gear pump. Wheel mounted on portable. Comes complete ready to work with hoses, spray bar, nozzles.

Ideal for: Maintenance of all types of pavement. Construction of driveways, parking areas, walks, tennis courts, roadways. **Painting** buildings, bridges, guard rails, equipment. **Sub-sealing** work. **Curing concrete.** **Waterproofing** foundations and roofs.

TARRANT Manufacturing Company

25 Jumel St., Saratoga Springs, N. Y.

. . . for more details circle 302, page 16



George D. Fox (right and below), president George D. Fox & Co., Baltimore, has made a thorough study of bituminous distributors, likes Littleford best. Here are . . .



2 big reasons why **LITTLEFORD** **SPRAY MASTER**

is tops in bituminous distributors

- ① "The 2-section full-area spray bar (above)—exclusive with Littleford — heats to spray temperature faster, saving 5 minutes on every load.
- ② "The single valve (left)—another Littleford exclusive—that controls 4 separate spraying operations—saves time in operation—simple: makes for better spraying.

"There are so many other reasons Littleford is tops in distributors—so many in fact that I've bought 14 Littleford Spray Masters. Want to know more? Write and ask Littleford Bros., Inc. to send you bulletin 14. They're at 454 East Pearl Street, Cincinnati 2, Ohio. Then use the chart below to make your own comparison."

—sincerely George D. Fox.

MAKE YOUR OWN COMPARISON . . .

	Littleford Spray Master	Distributor A	Distributor B	Distributor C
Multi-pass continuous heat flue system?	Yes	—	—	—
Heat chamber with damper?	Yes	—	—	—
Air cooled flue liner?	Yes	—	—	—
Single valve control?	Yes	—	—	—
Right angle drive?	Yes	—	—	—
4-speed transmission?	Yes	—	—	—
Two section full area circulating spray bar?	Yes	—	—	—
Hydraulic spray bar lift?	Yes	—	—	—

world's most complete line of completely engineered black top equipment

HAUCK EQUIPMENT



Thawing
Burners



Double Jacketed
Rubber and Asphalt Furnace



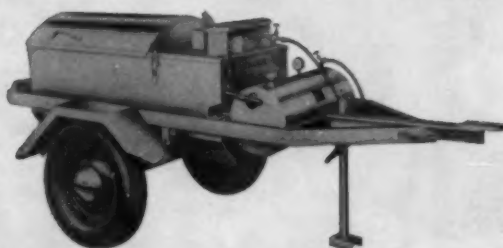
Compound
Melting Furnace



Lead Melting Furnace



Asphalt Tool
and Cement Heater



SPEED-MASTER MELTING KETTLE

Hauck—the originators of the tube type melting kettle—now offer this greatly improved immersion tube melting kettle with many engineered advancements in design and construction. Sizes—55-, 80-, 115-, 165-, 230- and 330-gal. capacities. Burn kerosene or bottled gas. Write for Bulletin No. 1058C.

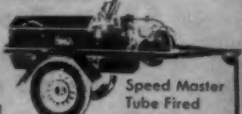
HAUCK MANUFACTURING CO.

110-140 Tenth Street - Brooklyn 15, N. Y.

Asphalt and Tar Melting Kettles



Bottom Fired



Speed Master
Tube Fired

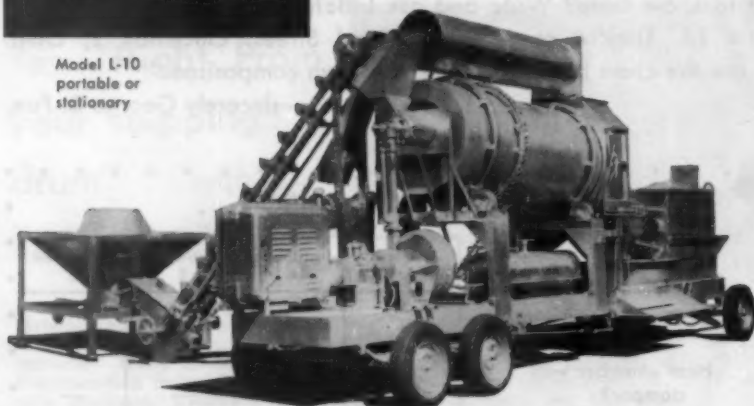
... for more details circle 322, page 16

White

NEW ASPHALT PLANT

\$13,500 (f.o.b. factory)

Model L-10
portable or
stationary



20 tons per hour hot mix capacity

Batch type 1000 lb. pug mixer with air-controlled gates. Has built-in asphalt heating kettle, reciprocating plate aggregate feeder. 50 hp engine or 30 hp electric motor. Write for catalog and name of nearest dealer. White Manufacturing Company, Elkhart 2, Indiana.

ONE MAN LOADS... ONE MAN OPERATES!

... for more details circle 315, page 16

222

KELLY FIELD FAILURE

(Continued from page 220)

ly convinced, the real reason for the failure of this mix was improper gradation of aggregates, and that applies to all Army mixes. It is physically impossible to make a first class mix within the Army gradations as set up in their specification.

The entire surface mix of the test pavement at Kelly was removed by a grader, leaving the binder mix in place. I have seen some poor mixes in my time but never a mix so poor that the surface course could be separated from the binder course by the blade of a grader. If, as they proposed, the asphalt content of this mix is reduced to 4 percent asphalt, you wouldn't need a grader, the wind would blow the pavement off the field.

There is a very important lesson to be learned from the failure at Kelly Field, and that is a lesson in proper gradation of aggregates.

From Our Readers . . .

To the Editor:

With reference to the article "Additives in Cut-Backs and Asphalt Cements," by Dr. Bascom of Lancaster Chemical Corporation, in your March issue, it is my opinion that nothing can completely overcome the disadvantages of wet aggregate or rain on newly applied surface treatment, but there is no doubt that a good additive can help to overcome these problems.

This is a controversial subject and it has been my observation that early extravagant claims and over-promotion of such materials were followed by a reaction generally opposed to their use. This has apparently levelled out now so that with most highway engineers these materials are viewed in their proper perspective in relation to the whole picture of mix and surface treatment production.

The present standards of the Massachusetts Department of Public Works specify that an anti-stripping additive shall be used in bituminous concrete (hot plant mix) only when placed as an overlay on cement concrete. It is likewise required in our cold mix winter stockpile patch material.

Its use in liquids applied on seal

(Continued on page 225)



There are times when **ONLY THE BEST* WILL DO!**

In prime coats, for example, you've got to have a priming material that penetrates deeply without separation, coats even dusty, fine aggregate particles uniformly, and binds them together tightly. That's why there's no substitute for Tarmac® as a prime coating for new base construction.

After penetration, Tarmac sets-up, binding the entire penetrated depth together into a firm waterproof layer. And Tarmac prime provides a tackiness which promotes an excellent bond between base and surface courses.

There's a copy of the "Tarmac Handbook" that's yours for the asking. For this handy guide to road construction methods, address your request to: Koppers Company, Inc., Tar Products Division, Dept. 124D, Pittsburgh 19, Pa.

**When planning your roads, remember the extra values TARMAC® gives you over other bitumens:*

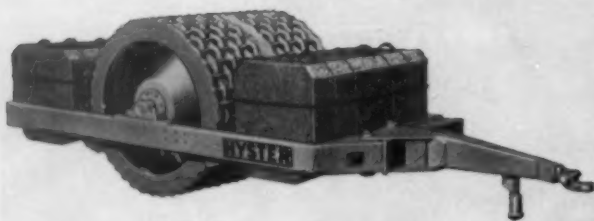
1. Faster coating of aggregate
2. Superior penetration
3. Better binding properties
4. Superior moisture resistance
5. Resistance to stripping
6. Self-healing properties



TARMAC® ROAD MATERIALS

**HIGH-SPEED
COMPACTION
LOW-COST
ROCK CRUSHING
EFFICIENT
BITUMINOUS SALVAGE**

**THE
HYSTER
"GRID"
ROLLER
DOES ALL
THREE!**



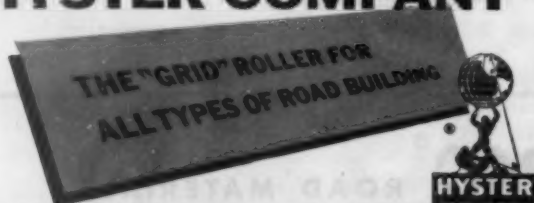
Here is the machine road builders all over the world are using on all types of road construction — free-ways, secondary roads, farm-to-market roads, access and logging roads.

Built for long life on any job—rock surfacing haul roads or high-speed compaction on expressways—the "Grid" roller is designed to give you low cost operation and maintenance. Its high capacity tapered roller bearings give long life. Its high-strength cast steel wheels resist wear in rock and abrasive materials. The heavy-duty frame prevents distortion in the toughest going.

"Grid" is the registered trademark for the Hyster open-surfaced roller. Caterpillar is the registered trademark of the Caterpillar Tractor Co.

**For full details,
call your Caterpillar-Hyster Dealer.**

HYSTER COMPANY



2995 N. E. Clackamas Street Portland 8, Oregon
1895 North Adams Street Peoria 1, Illinois
Portland, Oregon • Peoria, Illinois • Nijmegen, The Netherlands



1 EMBANKMENT COMPACTION—High-speed rolling (up to 15 MPH towed by Caterpillar DW15 Tractor) matches compaction with yardage of high-speed earth movers.



2 ROCK CRUSHING—Pit-run rock quickly and efficiently crushed for base and surface courses on secondary road construction and repair.



3 BITUMINOUS SALVAGE—Quickly breaking down old ripped-up mat, the "Grid" Roller salvages all of the original aggregate and reusable binder for use in new surface.

... for more details circle 248, page 16
ROADS AND STREETS, April, 1957

(Continued from page 222)
coat or surface treatment work is discretionary on the part of the District Highway Engineer and presumably he takes into consideration the type of stone, its cleanness and dryness. In this class of work, however, emphasis is placed by this office on the use of such agents on the cover stone aggregate rather than in the bitumen and this method is used much more extensively than through incorporation of the additive in the bitumen.

It would seem that Dr. Bascom's article might well stimulate interesting opinions from both sides of the subject which could be of value to your readers.

G. C. Love
Maintenance Engineer
Massachusetts Department
of Public Works

Summer Asphalt Course For Engineering Instructors

Asphalt paving technology will be the subject of an 8-week program of graduate study to be offered by the Institute of Transportation and Traffic Engineering, University of California, Berkeley, beginning June 17. Twenty grants in aid, of \$900 each, are being offered to facilitate participation, as students, of qualified college engineering instructors. This aid has been made possible by a grant to the university by the Asphalt Institute.

The program will consist of two graduate courses of advanced study in asphaltic mixtures, highway and airport pavement design and related matters. A series of weekly seminars will draw upon the talents of outstanding specialists for discussion of a variety of problems in the field. The extensive staff and facilities of the Berkeley College of Engineering, including the ITTE's thoroughly equipped Soil Mechanics and Bituminous Materials laboratory, lend support to the program.

Interested instructors should contact the ITTE, University of California, Berkeley 4.

New Littleford Dealer

E. S. Brent, sales manager, Littleford Bros., Inc., Cincinnati, Ohio, has announced the appointment of a new Littleford dealer, the Ray-Brooks Machinery Co. of Montgomery, Alabama.

Ray-Brooks Machinery will handle the complete line of Littleford road maintenance equipment including the Heater-Planer, Trail-O-Dryer, utility spray tank, pressure distributor, Trail-O-Patcher,

supply tank, Trail-O-Roller, "Tankar" heater, road broom, True-Lay paver spreader, and small paving tools.

Mesh Reinforced Bituminous Surfacing for N. J. Bridges

Wire mesh reinforced hot mix surfacing has been adopted for the widening or replacement of the decks of several bridges in the Atlantic City area.

As described by the New Jersey state highway department, this type

of surfacing has been chosen for all locations where bituminous concrete is to be applied on existing or replacement wood planks. The undertaking is an experimental one to develop additional data on the durability of this construction.

The work, which involves six structures on U.S. 40 near Atlantic City, advertised for bids this spring with the requirement of completion on or before July 1 when the tourist traffic reaches its peak. Maintenance of one traffic lane at all times is a condition of the job.

NEW DESIGN! NEW EFFICIENCY!



Asphalt men designed it. Asphalt men tested it. The new Standard Asphalt Distributor has been field tested for two years on every type and grade of asphalt available, over three million gallons in all.

MODEL 424-56 PRESSURE DISTRIBUTOR

New power, New pump, All new features—as follows: A new "Econo-bar" spray bar in addition to the famous Standard Steel "Miracle" spray bar. New hydraulic spray bar lift. More convenient, easier to operate controls. Shorter, simplified piping to reduce heat bleed-off.

The Model 424-56 is built in 1000, 1250 and 1500 gallon capacities as standard and can be furnished in other capacities, either truck or semi-trailer mounted.

Write for Catalog #RS1256 or see your dealer.

OTHER PRODUCTS OF STANDARD STEEL
ASPHALT DISTRIBUTORS . . . BURNERS
... POWER AND TRACTION DRIVEN
CONSTRUCTION BROOMS . . . MAINTENANCE
DISTRIBUTORS . . . TAR KETTLES
... AGGREGATE SPREADERS . . . PIPE
LINE EQUIPMENT . . . SUPPLY TANKS
... SHELVING HARDWARE . . . AND AGRICULTURAL EQUIPMENT



Standard Steel Works, Inc., NORTH KANSAS CITY, MO.

PD 157

... for more details circle 267, page 16

Manufacturers' Literature

Electric Heating for Asphalt Plants

An informative bulletin (Catalog A-128) on electric heating for free flow of bituminous materials and fuel oil in stationary and portable asphalt plants is available from Hynes Electric Heating Division of Turbine Equipment, Mountainside, N.J. A double-page illustration

For more information circle 108 on Service Coupon Page 16 and mail now.

of a typical asphalt plant, supplemented by a plant flow diagram, clearly shows the application of Hynes heaters to storage tanks, piping, metering devices, weigh bucket, pug mill and fuel oil system; and the bulletin also includes illustrations of Hynes heaters for these purposes.

For more information circle 109 on Service Coupon Page 16 and mail now.

Street Lighting

A new publication on mercury vapor street lighting is available from the General Electric Co., Schenectady 5, N.Y. The bulletin, designated GEC-1403, discusses the use of mercury vapor lumi-

For more information circle 110 on Service Coupon Page 16 and mail now.

naires in lighting all classes of streets and highways—residential streets, business and traffic streets, whiteways, and turnpikes. It includes descriptions of the complete line of General Electric mercury vapor luminaires together with technical data on photometric performance, distribution of initial candlepower, and dimension diagrams of the various units.

For more information circle 111 on Service Coupon Page 16 and mail now.

Crawler Tractors

How to maintain profits in the face of rising costs and falling prices is the topic of a 12-page illustrated booklet published by Caterpillar Tractor Co., Peoria, Ill. It is called "Big Tracks." Form DE627. The booklet graphically illustrates how the company's largest crawler tractors—the D6, D7, D8 and D9—are engineered and manufactured. Long-life features of design and construction are dealt with in detail, as well as how ease of operation allows the operator to get more production out of a day's work. Further use of Caterpillar's big tractors, through the use of matched tools, is illustrated in explaining how increased versatility decreases operating costs.

For more information circle 112 on Service Coupon Page 16 and mail now.

Rock Bits; Drill Steel

Brunner & Lay Products are featured in a new 20-page catalog #756 which includes, carbide rock-bits, drill steels and pneumatic tool accessories—such as, mail points, sabur points, clay spades, asphalt cutters, etc. Pictures and complete specifications are given for each product, along with suggestions for obtaining the best drilling results with Brunner & Lay carbide Rock-Bits. Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill.

For more information circle 113 on Service Coupon Page 16 and mail now.

Power Train

An 8-page, fold-out bulletin describes the new "Transverter" power trail "package" designed by the Transmission Division of Clark Equipment Co., Jackson, Mich., for off-highway and stop-and-go service. The bulletin emphasizes the compact size, simple trouble-free components, easy installation and long service life of the unit. The three major components, —torque converter, disconnect clutch and transmission—are illustrated. There is also a cutaway diagram of the assembled unit. Specifications and dimensions included in the bulletin indicate that it is rated for engine torque up to 325 lb-ft.

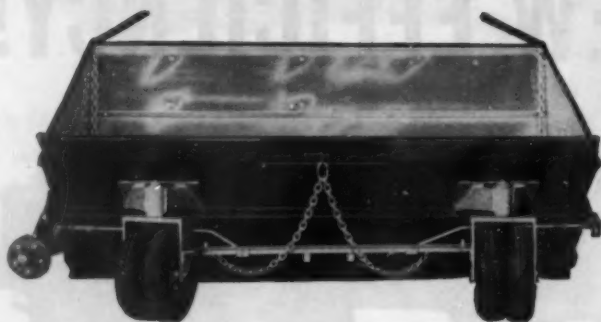
For more information circle 114 on Service Coupon Page 16 and mail now.

Reflective Pavement Markers

A new fully illustrated catalog, available from Prismo Safety Corporation, Huntingdon, Pa., gives all the facts about Plastix, the reflective pavement marking material. The catalog has photographs, diagrams of Plastix markers and where and how to use them.

For more information circle 115 on Service Coupon Page 16 and mail now.

OVERMAN STONE AND BITUMINOUS SPREADER



IMPROVED . . . This all-purpose, low cost spreader is now equipped with pneumatic tires, providing easier steering and moveability, and eliminating vibration and road shocks when towing.

If this spreader is not part of your paving equipment, investigate at once. It's the most efficient, easiest operating paver available, and its low price will surprise you.

WRITE
FOR
BULLETIN
TODAY

I. J. Overman Mfg. Co.
BOX 896 MARION, IND.

. . . for more details circle 279, page 16

SWENSON SPREADERS Speed Sealcoating!

Spreads Salt or Chloride
for DUST CONTROL or
SOIL STABILIZATION

write for complete
information

SWENSON SPREADER
& MFG. CO.

Lindenwood, Illinois



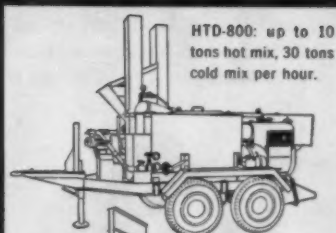
. . . for more details circle 299, page 16



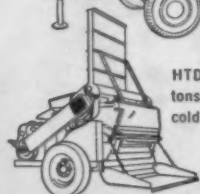
For Low Cost Paving or Patching



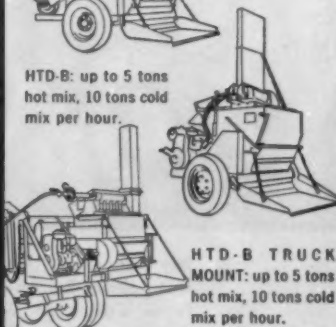
McConnaughay ASPHALT MIXERS



HTD-800: up to 10
tons hot mix, 30 tons
cold mix per hour.



HTD-500: up to 7
tons hot mix, 15 tons
cold mix per hour.



HTD-B: up to 5 tons
hot mix, 10 tons cold
mix per hour.

HTD-B TRUCK
MOUNT: up to 5 tons
hot mix, 10 tons cold
mix per hour.

For details and specifications,
write, wire or 'phone . .

K. E. McCONNAUGHAY LAFAYETTE, INDIANA

National distributors: Asphalt Equipment Co.,
Inc., 3334 Cherry Lane, Fort Wayne, Indiana

. . . for more details circle 269, page 16

ROADS AND STREETS, April, 1957

Highway Spreader

An illustrated bulletin describing the new Shunk Torwel front and rear reversible automatic highway spreader has been released by Shunk Manufacturing Company, Bucyrus, Ohio.

The new Shunk Torwel highway spreader was displayed recently at the AED convention in Chicago where it was viewed by equipment men, contractors and public works officials.

The key feature of the machine is its versatility, according to the bulletin. It can be installed to spread in front of the rear wheels for ice control work and then be reversed as a single unit for asphaltic sanding and other types of material spreading.

For more information circle 116 on
Service Coupon Page 16 and mail now.

Wire Rope Bulletins

"Rope Dope" is the title of a series of educational bulletins published by Union Wire Rope Corporation. In Volume No. 5 of Rope Dope educational bulletins, now off the press, the accumulation of recommended practices have been reorganized and are carried in more normal sequence through seven different bulletins. Much new information has been included. For example, in Rope Dope No. 1 of the new series is an entirely new formula, based on factual data, which enables the users to predetermine the relative service life of different rope constructions.

For more information circle 117 on
Service Coupon Page 16 and mail now.

Dump Bodies and Hoists

Gar Wood Industries' new 12-page catalog describes and illustrates the company's medium duty dump bodies and arm-type hoists. Bodies for every hauling need are pictured with all the special features for the particular job indicated. Arm-type and direct lift hoists, as well as the popular conversion hoists are clearly illustrated and described. Specifications for hoists with capacities ranging from 6 to 12 tons are also outlined in the brochure.

For more information circle 118 on
Service Coupon Page 16 and mail now.

Hydraulic Pumps, Valves

Oil Hydraulic Pumps, Fluid Motors and Valves: Sixteen-page, two-color, illustrated brochure details function and design of oil hydraulic pumps, tandem pump and motor-pump combinations and control valves for hundreds of varied installations. Applications include pressure lubricating, oil circulating, oil filtering, lift systems, oil transfer, replenishing systems, agricultural implements, industrial trucks, power steering (industrial and agricultural), tractor loaders, machine tools and construction equipment. Specifications, capacities and performance data are given. Available from: Webster Electric Company.

For more information circle 119 on
Service Coupon Page 16 and mail now.

LUBRIPLATE No. 630-AA LUBRICATES ABOUT EVERYTHING



LUBRIPLATE No. 630-AA is practically a universal grease type lubricant. It was developed to meet industries' need for "simplified lubrication" . . . one lubricant to effectively satisfy a great number of requirements. LUBRIPLATE No. 630-AA has a smooth, stable consistency, a wide temperature range, possesses high film strength, fine adhesive properties and is water repellent. It satisfies most lubrication requirements, thus eliminates the need for a different lubricant for each application in many cases.

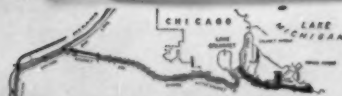
**REGARDLESS OF THE SIZE AND
TYPE OF YOUR MACHINERY,
LUBRIPLATE LUBRICANTS
WILL IMPROVE ITS OPERATION
AND REDUCE MAINTENANCE**

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Write for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. LUBRIPLATE DIVISION, Fiske Brothers Refining Company, Newark 5, N. J. or Toledo 5, Ohio.



. . . for more details circle 267, page 16

On the Cal-Sag channel widening project



Mary Construction gets the job done... uses STANDARD Fuels and Lubricating Oils

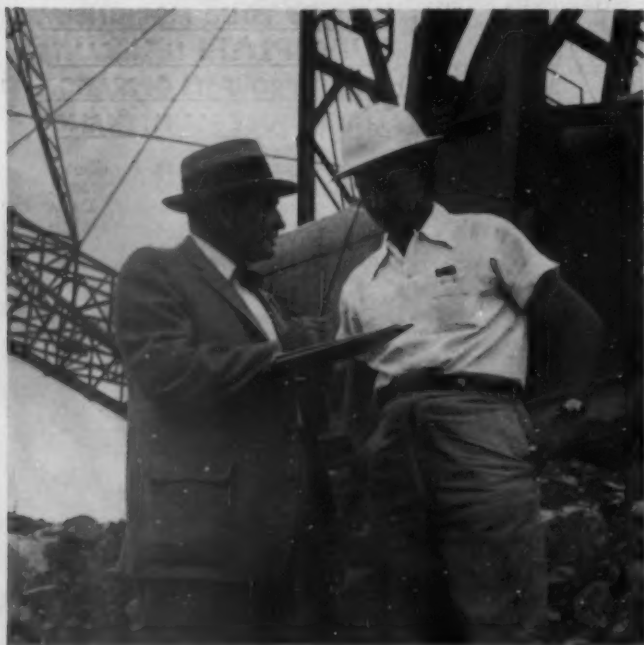
In 565 days, Mary Construction will widen 3.5 miles of the Cal-Sag ship channel. The channel will be widened to 225 feet from its present 60 foot width. To do this, Mary Construction will move 2.8 million yards of dirt and rock. Big job. Big need for service on gasoline, diesel fuel, lubrication oils. Mary Construction buys from Standard Oil.

This is why Irvin Garms, general superintendent, and Bill Jordan, project superintendent, decided on Standard Oil products. First, they knew they would get products of top quality. Just as important, they knew they would get service. Standard's bulk plant is only four miles from the project. Deliveries are made twice daily. Additional emergency trips were made at first, but with the delivery point only four miles distant, there was no strain. Men experienced in rendering technical service to contractors were assigned to the project from Standard's Joliet Division office only a few miles away.

Get this kind of service on your job anywhere in the 15 Midwest and Rocky Mountain states. Call your nearest Standard Oil office. Or write, Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Ill.

Steve Adamec, Standard Oil chief automotive engineer, and Irvin Garms, general superintendent for Mary Construction, watch Lima dragline in action. Helping customers with the lubrication of equipment such as this is something for which Steve Adamec is well fitted. Steve has a mechanical engineering degree from Purdue. He has provided technical service to customers for 10 years. Steve is a graduate of Standard's Sales Engineering School.

... for more details circle 296, page 16



Project Superintendent Bill Jordan and Ray Elgas lay out schedule for servicing Page dragline. Page has 9.5 yard bucket, is powered by Page 1/2 vertical V6, 700 h.p. diesel engine. All equipment uses STANDARD products.



Ray Elgas (right) gets some facts about Cat operation from operator Scotty Cummings. For more than 12 years, Ray has been helping automotive customers with lubrication technical service. He qualified for this work after completing the Standard Oil Sales Engineering School. Before joining Standard Oil Company, Ray attended the University of Nebraska.



STANDARD OIL COMPANY (Indiana)

HIGHWAY ENGINEERS DESIGNERS DETAILERS

FOR OFFICE WORK IN ST. LOUIS ON HIGHWAYS
EXPRESSWAYS AND ASSOCIATED CIVIL WORKS

- Permanent employment for qualified men
- Ample opportunity for advancement based on merit
- Generous transportation & moving allowances

Plus Employee Benefit and Retirement Plan, Paid Vacations,
Holidays, Sick Leave. Blue Cross available.

PLEASE WRITE FULLY TO OR INQUIRE AT

SVERDRUP & PARCEL ENGINEERING CO.
1134 LOCUST ST. ST. LOUIS 1, MO.

Engineer—experienced. For medium sized contracting firm engaged in heavy construction, principally highways, airports, bridges, interested in intelligent, ambitious engineer. Duties would include engineering layout for excavation, paving and structures; estimating proposed jobs; and computing quantities of work done. Would touch on all operations of company and lead to executive position for right man. Salary open. Reply by letter giving resume of education, experience and references. East. Write Box 1182, Roads and Streets, 22 West Maple Street, Chicago 10, Illinois.

Available CONSTRUCTION SUPERINTENDENT or PROJECT MANAGER

Age 45 free to travel, Civil Engineer, large projects, heavy construction, U. S. Flood Control Projects, Railroad, State Highways, Industrial & Structural Buildings, Airports, Sewers, Paving, Bridges, Concrete Foundations, Handled sub-contracts, Labor Relations problems, Cost conscious. 14 years' experience. Will accept work foreign service. Write Box 1183, Roads and Streets, 22 W. Maple St., Chicago 10, Ill.

STEEL SHEET PILING

380 pcs. BETH. SP4 — 20' to 40'
462 pcs. AP3 — 21', 25' and 30'
377 pcs. M116 — 25', 29' and 40'
307 pcs. M227 — 44'
416 pcs. ZP32 — 25', 37' and 50'
362 pcs. MP101 — 45' and 60'
198 pcs. BETH. ZP32 — 62'

15 x 24 PORTABLE CRUSHER
MODEL 15 A DIAMOND CRUSHING
PLANT, 15 x 24 JAW CRUSHER
30" x 8' APRON FEEDER, HOPPER
24" x 26' CONVEYOR, GASOLINE
ENGINE ON PNEUMATIC TIRES

R. C. STANHOPE, INC.
60 E. 42nd St., New York 17, N. Y.

ENGINEERS — FOREMEN — OFFICE MEN

Learn latest methods to organize and run work. Prepare for the top jobs. Send post card for details.

GEO. E. DEATHERAGE & SON
CONSTRUCTION CONSULTANTS
P.O. Box 921 Lake Worth, Florida

FOR SALE

1—Euclid Loader, Model 10B151 Serial #151,
54" belt w/Cummins Diesel Engine Model
NHB15. Used approximately 3 months. A
real buy\$10,000.00

CAMPANELLA & CARDI
CONSTRUCTION CO.
780 Jefferson Blvd.
Hillsgrove, Rhode Island
Ph. Regent 7-1300

FOR SALE—Model TS-360
Challmer Motor Scraper. Used
one Season. Perfect Condition.
Looks and Runs Like New. Must
Sell. Price \$17,500.00.—W. W.
Ideker, Mound City, Mo. —
Phone 60

CLEARING HOUSE SECTION

GRADING & CONCRETE PAVING EQUIPMENT

- 2—DB Cat Tractors with angle blades and D.D.P. Units, S/N 2U5173 and 1H8690.
- 1—DB Cat Tractor with push plate and D.D.P. Unit, S/N 1H6122.
- 1—D7 Cat Tractor with push plate and D.D.P. Unit, S/N 7M4127.
- 1—Model HD20 Allis Chalmers Tractor and Garwood Angle Blade, S/N H4324.
- 1—Scraper, Garwood 25 cu. yd., S/N 5231.
- 1—Buffalo Springfield Roller, 10 Ton, S/N 18680, w/ Waukesha gas engine, Perfect condition—\$3,500.00
- 1—5-8 Ton Buffalo Springfield Roller, S/N 21936, perfect condition ----- 2,500.00
- 1—Parts Trailer with Steel bins installed ----- 1,500.00
- 1—Air Compressor, Gardner Denver, 210 ft., Cat Diesel Engine.
- 1—Air Compressor, Worthington, 105 Ft., Waukesha Gas engine.
- 1—Cleveland Subgrader, pull type multiple blade and scarifier, S/N 54X68, Like New ----- 2,000.00
- 1—Lot 2080 Feet Heltzel road forms, 9" high, 8" base with locks & pins, in excellent condition. Per L. FL ----- 1.50
- 1—Dewalt Radial Saw ----- 400.00
- 3—Master Vibrators—Elec. Each ----- 200.00
- 1—Mahl Gas Power Concrete Vibrator ----- 250.00
- 1—Set DB Rails and grousers, pinned, bushed and built up rails & grousers (2 Complete) ----- 1,500.00
- 1—Set New D7 rails & grousers (2 Complete) ----- 1,725.00
- New D7 & D8 Bottom rollers. 80% New Price
- 1—Backhoe Boom only—new—for P & H 255A ----- 500.00
- 1—House Trailer, Spartan Mansion — 33 ft. ----- 1,500.00
- 1—Gardner Denver Wagon Drill -- ----- 1,000.00
- 2—12:00 x 20—14 Ply—Nylon new tires. Each ----- 180.00
- 1—2 cu. yd. Omaha Dragline Bucket ----- 700.00
- 1—2 cu. yd. Esco Coal Loading Dipper—Complete ----- 2,000.00
- 1—4½ cu. yd. Hendrix Heavy Duty Dragline Bucket ----- 700.00
- 1—Buda Humden Earth Drill, with 18" Augar, will dig 10 ft. deep hole ----- 1,500.00
- 1—Lot Jack Hammers, paving breakers and Earth Tamps.

All this equipment in extra good condition and ready to do a job. Should be inspected to be appreciated.

All this equipment is subject to prior sale.
Contact us for prices on any not priced.

HART & HART

P.O. Box 52 - Clay City, Ind.
Phones 165 or 145K12

CRUSHING PLANT in the Southeast. 42 x 48 r.b. Pioneer jaw & feeder. 4½' Symons. 3' Trayler. 600 cfm compressor. 2½ yd. & 1½ yd. shovels. 15 ton Euclids. Conveyors. Screens. Feeders. 20", 3", 4" & 7' SYMONS. 16", 30", 36", 42" Superior McCully. Pioneer 5424 dbl. & 4022 trp. rolls. Ball mills 6 x 12, 6½ x 6, 277, 3648 & 4042 jaws with power. 3630 New Holland Impactor. 75" x 20" Akins classifier. 7 x 50 Eagle log. 4100 ft. of 42" conveyor. 20 ton side dump cars. 140 ton locomotive. 600 hp double drum hoist (can be converted to 1600 hp).

MIDWEST LOCATIONS: AMERICAN REVOLV-ER R-20. 35 ton truck crane. P & H 105 L.C. N. W. 6. 164. 80-D. 6 x 10 Link Belt grizzly. 30" magnetic separator. 6 x 14 sq. deck Simplicity heavy duty scalper screen. 10 & 18 ton std. gas locomotives. 1700 & 1548 cfm compressors. Cedar Rapids Pitmaster, Super Tandem, Master Tandem & Senior plants. 34 ton end dump Euclids.

STANLEY B. TROYER EQUIPMENT COMPANY
Box 97 Phone 500 Crosby, Minnesota

CLEARING HOUSE SECTION

— BEAT NEW HIGH PRICES HERE — ARMY SURPLUS — GOOD USED EQUIPMENT — — USED VERY LITTLE —

TRUCK CRANES - ARMY SURPLUS
1. LORAIN MC-2 #11833 mounted on factory 6 x 4 carrier, 32' boom 7½ KW Generator and 20' Magnet F.O.B. \$11,500.00
Lorain MC-2 #13787 mounted on factory 6 x 4 carrier, basic boom, Waukesha engine in crane and carrier F.O.B. 13,500.00
Lorain MC-4 #13088 mounted on factory 6 x 4 carrier, basic boom, Chrysler industrial 8 cyl. motor in crane and carrier F.O.B. 16,500.00
BROWNING T-150 #3481 mounted on factory 6 x 4 carrier, 40' basic boom, Waukesha motor in crane and carrier F.O.B. 13,500.00
P & H 1907C #2689 mounted on factory 6 x 4 carrier, 48' basic boom and Chrysler industrial 8 cylinder motor in crane and carrier F.O.B. 10,500.00

CRAWLER CRANES - ARMY SURPLUS
BAY CITY 20 #3179 with Hercules J X C gasoline motor, 30' 2 place boom, ½ yard capacity F.O.B. \$ 5,500.00
Bay City 37 #3097 with IHC UD-14 diesel motor, 35' boom and fairleads ¼ yard capacity F.O.B. 9,500.00
B-E 10B #20334 with Buda 6 cylinder gasoline motor and shovel front, ½ yard capacity F.O.B. 7,500.00
B-E 10B #27460 with IHC UD-9 diesel motor, 38' boom and shovel front F.O.B. 7,500.00
B-E 10B #37477, Chrysler industrial 8 cylinder motor and backhoe F.O.B. 8,500.00
B-E 10B #33264, Chrysler, industrial 8 cylinder motor and backhoe F.O.B. 8,500.00
B-E 10B #24116, Buda 6 cylinder gasoline motor and backhoe F.O.B. 8,500.00
B-E 10B #37472, Chrysler industrial 8 cylinder motor and backhoe F.O.B. 8,500.00
B-E 22B #37738, G.M.C. 471 diesel and 35' boom F.O.B. 11,500.00
08GOOD 200 #3621, White 6 cyl. gas. ½ yd. Shovel or Crane F.O.B. 5,500.00
08GOOD 200 #4334, Chrysler ind. 8 cyl. 30' boom ½ yd. F.O.B. 4,000.00
08GOOD 200 #4016, Chrysler ind. 8 cyl. 30' boom ½ yd. F.O.B. 4,000.00
08GOOD 200 #4824, Chrysler ind. 8 cyl. 30' boom ½ yd. F.O.B. 4,000.00
08GOOD 200 #3822, Buda 6 cyl. gas. 30' boom ½ yd. F.O.B. 4,000.00

08GOOD 200 #3353, Buda 6 cyl. gas. 28' boom ½ yd. F.O.B. 4,000.00
08GOOD 200 #4228, Buda 6 cyl. gas. 30' boom ½ yd. F.O.B. 4,000.00
08GOOD 50 #5097 Buda 6 cyl. gas. Backhoe ½ yd F.O.B. 5,000.00
2. MARION 342 #2642, Cat. 4600 diesel, 20' boom, 1 yard F.O.B. 13,500.00
MARITOWOC 2000B #2270, Hercules diesel, Crane or Shovel, 1½ yd. F.O.B. 17,000.00
LINKBELT LS-75 #11873, Chrysler ind. 8 cyl. 30' boom F.O.B. 10,000.00
GENERAL 307 #2523, Chrysler ind. 8 cyl. 40' boom F.O.B. 8,750.00
LINKBELT LS-50 #5197, Buda gasoline 6 cyl. 30' boom F.O.B. 5,500.00
LIMA 101 #127 Crawler 1½ yd. with 60' boom F.O.B. 5,000.00

CRAWLER TRACTORS
CAT. D-4 #7U-19138, Cat. Hyd. Angle Dozer, New 1953 excellent condition F.O.B. 4,750.00
CAT. D-4 #277397, Bucket Loader, Hyster Winch, Army surplus used 900 hours F.O.B. 4,000.00
CAT. D-6 #29U-4634, Cat. 25 DDPUC and Cat. 6A, Rebuilt by Cat. dealer F.O.B. 8,000.00
CAT. D-6 #29U-5281, Cat. 9L Dozer, Rebuilt by Cat. dealer F.O.B. 9,500.00
CAT. D-6 #10A-426, Shovel-Loader, Rebuilt by Cat. dealer F.O.B. 14,000.00
CAT. D-7 #7M-9558, LeTourneau Angle Dozer, Hyster rear winch, Army surplus F.O.B. 7,500.00
CAT. D-7 #4Y-3719, LeTourneau Angle Dozer, Hyster rear winch, Army surplus F.O.B. 7,500.00
CAT. D-8 #1H-4884, LeTourneau Angle Dozer, Army surplus, Used 1500 hours F.O.B. 6,500.00
CAT. D-8 #6R-5798, LeTourneau DDPUC, Army surplus, Used 1300 hours F.O.B. 6,500.00

MISCELLANEOUS
BARBER-GREENE 554 Coal Loader #48-77, Army surplus UNUSED F.O.B. \$ 3,000.00
GALAN 25-Ton, Tandem, Dropdeck Trailer, New 1955 F.O.B. 2,500.00
INGERSOLL-RAND 210 Air Compressor, 4 Pcu. tires, Waukesha gas. F.O.B. 1,500.00

CAT. DW 18, Tractor #1N-2027, Army surplus, Used 950 hours F.O.B. 2,500.00
JAEGER 600, Air Compressor, 4 Pcu. tires, UD-24 diesel, Rebuilt by dealer, New 1953 F.O.B. 5,500.00
JAEGER 40' Pile Drivers, Model Dixie double drum hoist, UNUSED Army Surplus F.O.B. 1,500.00
LEROI 600 Air Compressor, Murphy diesel, pneu. tires, Army Surplus F.O.B. 5,500.00
LaTOURNEAU K-30, Rooter F.O.B. 800.00
MISSISSIPPI Bottom Dump Wagons, UN-USED Army Surplus, 14 yard capacity F.O.B. 1,800.00
TAMPCO Compactors, Pneumatic Tires F.O.B. 1,200.00
CAT Pull Grader New, Fodel 66, UNUSED Army Surplus F.O.B. 1,800.00
ORTON #42876 25T Locomotive Crane, 50' boom, Cat 13000 diesel, Navy Surplus, 4000 hrs. F.O.B. 20,000.00

ATTACHMENTS - ARMY SURPLUS
BAY CITY 45 Backhoe UNUSED \$1,500.00
BAY CITY 65 Shovel Front UNUSED 1,350.00
BAY CITY 20 Hoe Dipper, Sticks UNUSED 300.00
BAY CITY 20 Shovel Front UNUSED 800.00
BAY CITY 65 Fairleads UNUSED 400.00
BROWNING T-20 Section 15' UNUSED 75.00
BROWNING T-15-C Craneboom Tip 13' UNUSED 450.00
BUCYRUS ERIE 22B Shovel Fronts each UNUSED 1,250.00
BUCYRUS ERIE 37B Shovel Front UN-USED 2,500.00
BUCYRUS ERIE 37B Craneboom 45' UN-USED 1,800.00
BYERS 83 Backhoe UNUSED 1,200.00
LIMA 34 Shovel Front UNUSED 1,500.00
LIMA 1201 Jibs and Harness each UNUSED 750.00
LIMA 504 Point Sheaves and Harness UN-USED 200.00
MICHIGAN TK Craneboom 30' UNUSED 450.00
MICHIGAN TM-16 Craneboom 30' UNUSED 650.00
NORTHWEST 25 Shovel Front UNUSED 1,750.00
NORTHWEST 8 Craneboom 30' UNUSED 1,900.00
P & H 655A Craneboom 70' UNUSED 1,250.00
P & H 655A Backhoe UNUSED 3,500.00
P & H 255 Craneboom 30' UNUSED 900.00
P & H 255 Extension 10' UNUSED 75.00
SHIELD BANTAM Jib 1' UNUSED 50.00
SHIELD BANTAM Section 5' UNUSED 50.00

ALL THE ABOVE LOCATED OUR YARD IN DOWNTOWN CLEVELAND

UDELSON TRUCK SALES, INC.
Superior 1-1666

3210 WOODLAND AVE.

Cleveland 15, Ohio

EQUIPMENT FOR SALE

- 1—Model 54B Bucyrus Erie Combination Shovel and Crane \$36,000.
- 4—Model 200 Rex double PUMPCRETE machines. Two powered by 50 HP electric motors and two with Waukesha gas engines 7,500. each
- 1—5 ton CABLEWAY with 1000' of 2" gut and 125 HP electric hoist 3,500.
- 2—1600' reels 3½" LOCK COIL cable 2. Ft.
- 1—Robinson Model 50 automatic CEMENT UNLOADER 2,000.
- 1—Wemco HYDROSEPARATOR 32' diameter powered by 7½ HP motor 9,000.
- 1—Koehring 4 cubic yard tilting CONCRETE MIXER 4,500.
- 4—Hydro Silica PUMPS powered by 15 HP motors 1,250. each
- 1—BACKHOE attachment for Model 22-B Bucyrus Erie Shovel 2,200.
- 2—Sets crawler FRAMES for Model 54-B Bucyrus Erie Shovel (1 set long & 1 set standard) 2,250. each
- 1—2 Drum Taylor MINE HOIST powered by 55 HP motor 1,500.
- 3—"Intelligent" water MONITORS with air controls for operation 1,500. each

GUY F. ATKINSON COMPANY

10 West Orange Avenue

South San Francisco, California

Phone: PLaza 6-0300, Extension 125

Wanted:

Used widening spreader for aggregate and asphalt, also good used trench roller, private contractor.

JOHN R. JURGENSEN COMPANY
NEWTOWN, OHIO

FOR SALE 2 MODEL O ROADSTER TOURNAPULLS

1—1954 Model in Excellent Condition
1—1950 Model in Good Condition
Rubber about 50%

E. M. PIPER & SON
CONSTRUCTION CO.
Benedict, Nebraska

PILE DRIVING EQUIPMENT

VULCAN AND MCKIERNAN-TERRY Steam Pile Hammers and Extractors

- DROP HAMMERS
- STEEL LEADS
- DRIVING CAPS
- PILE DRIVER HOSE
- HOISTS AND BOILERS

STEEL SHEET PILING

Pcs.	Section	Length	Location
94	MP-116	34 to 33 ft.	Wisconsin
101	MP-116	13 to 20 ft.	Iowa
75	MP-116	60 ft.	Chicago
110	MP-115	35 to 60 ft.	Kansas City
130	MP-116	35 to 45 ft.	Alabama
36	MP-115	60 ft.	Nebraska
175	MP-116	35 to 60 ft.	Kansas City

CONMACO

PHONE
DRexel 1-3930

CONTRACTORS MACHINERY COMPANY
806 KANSAS AVE., KANSAS CITY, KANSAS

FOR SALE

- 1 Pioneer Roll & Jaw Crusher 9" x 36" jaws
- 3' x 10' double deck screen — D318 Cat engine \$9500
- 1 1950 Hendrickson 10 yd tandem drive dump \$2350
- 1 1950 F8 Ford 6 yd dump \$ 700
- 1 Small Huber Grader \$ 925
- 1 D4 Cat with Traxacator loader—needs track repairs \$ 950
- 1 Mead Morrison ½ yd drag scraper—60 ft. cable \$ 175
- 2 Timken Tandem drives for heavy truck on air brakes \$
- 1 Rear Axle & Carrier from 52 Mack—on air brakes—like new—cheap \$
- 1 General Excavator ½ yd shovel with Chrysler 8 Industrial Engine \$1150

EDWARD BARTUS

Route #2
Mosinee, Wisconsin

A LARGE AUCTION CONSTRUCTION EQUIPMENT

FRIDAY, MAY 24, 9 A.M. (EDST)
PITTSBURGH, PENNSYLVANIA

LOCATION: The yard of the Monroe Equipment Corp. at 339 Haymaker Road, Monroeville (Pittsburgh), Pa., just 1/2 mi. Northwest of the Pittsburgh interchange of the Pennsylvania Turnpike (junction with US Hiway 22), or 14 miles from downtown Pittsburgh.

NOTE: Equipment owned by Monroe Equipment Corp. which is a joint venture of the M & S Construction Co. Inc., and Rochez Bros., Inc. All equipment is in good condition, ready to go right to work this season.

EACH PIECE POSITIVELY SELLS TO THE HIGHEST BIDDER WITHOUT LIMIT, MINIMUM OR RESERVATION!!!

SHOVELS-Draglines: Lima 1201 Shovel, S/N 3482, (also 80' Boom), good; Lima 802 Dragline, S/N 3144, (also Standard & Stripping Shovel Fronts), very good; Bucyrus-Erie 54-B Shovel, S/N 25702, excellent; Lorain TL-25 Shovel-Hoe-Drag; Lorain TL-20 Hoe-Shovel-Drag; Insley K-12 Hoe; NW 80D & P&H 555 Shovel Fronts; Buckets & Parts for above machines.

TRACTORS-LOADERS: 2 Cat D-8's, 13A's with 8A dozers & 25 CCU's, NEVER USED; 14 D-8's, 2U 15535 to 2U 9251, all with 8A dozers, 25 CCU's, low hours; Quantities of D-8 Parts; 2 AC HD-19's with cable dozers, torque converters; 7 AC HD-19's, with PCU's & Push Blocks, torque converters; AC HD-20G Loader, S/N 3416, overhauled & excellent; 3 AC HD-5G Loaders, S/N 26885 to 13219; D-4 cable Loader.

EUCLIDS: 12 Euclid 49FD 15 Ton End Dumps, S/N 9781 to 5386, GMC 671 power, 8 with quarry beds; 5 Euclid 27FD 15 Ton End Dumps, S/N 4097 to 3286, Cummins power; 4 Euclid 38FDT Bottom Dumps, S/N 9735 to 9732, Model 89 Wagons, GMC power; 3 Euclid 9FDT Bottom Dumps, S/N 3005, 6 & 7, 58W Wagons, Cummins power.

MOTOR SCRAPERS-SCRAPERS: 6 AC TS-300 Motor Scrapers, S/N 669 to 548, low hours; 2 Woolridge TCR 14-18 yd Scrapers; 5 Woolridge TCH 23-27 yd Scrapers; 3 Garwood 524 19-24 yd Scrapers; Le-Tourneau 12-Y Scraper.

GRADERS-ROLLERS-ROOTERS-MISC. EQUIP: 2 Cat 12 Graders, S/N 8T 15774 & 8T 5139, power steering; Galion 10-T 3-Wheel Roller; Buffalo-Springfield & Huber 5-T 3-Wheel Rollers; Euclid 8-M DD Tamping Roller; 2 Woolridge RH3 Rooters; Le-Tourneau K30B Rooter; Parsons 25 Ditcher; Vulcan 400-A Pile Extractor; PMCO 75-W Path Digging Loader; Dumpveyor, Model 54; Others.

COMPRESSORS-DRILLS: Gardner-Denver 365, Jaeger 315 & 105, Schramm 160 Portable Compressors; 2 LeRoi 48 & 2 Ingersoll-Rand FM Wagon Drills; McCarthy 105 Vertical Auger Drill; McCarthy 103 Horizontal Auger Drill; 2 Hardsocg F-11 Horizontal Auger Drills; Quantities of Air Tools.

ALSO: Welders; Pumps; Trucks; Trailers; Shop Equipment; Parts; Tools; Miscellaneous; Many Other Items.

WRITE-WIRE-CALL Auctioneers for complete list. **INSPECT** any time after May 17, equipment will be demonstrated. **TERMS:** Complete Payment Sale Day, Certified Checks, Cashier's Checks.

EACH PIECE POSITIVELY SELLS TO THE HIGHEST BIDDER WITHOUT LIMIT, MINIMUM OR RESERVATION!!!

MONROE EQUIPMENT CORPORATION—Owner

(Joint venture of M & S Construction Co. and Rochez Bros., Inc.)

FORKE BROTHERS
the Auctioneers

321 Sharp Bldg. Lincoln, Nebraska Phone 2-1045

— EQUIPMENT AUCTION LEADERSHIP SINCE 1921 —

339 Haymaker Road,
Monroeville, Pa.

Ph: BR 1-3627 or VA 3-0430

SPRING EQUIPMENT SALE

SLIGHTLY USED U.S. GOVERNMENT SURPLUS CRANES, ROLLERS, BULLDOZERS, TRUCKS, FORK LIFTS

- Northwest Model 25, ¾ yard with 40 foot boom, Caterpillar D4600 diesel engine, backhoe available\$7,500.00
- Bucyrus-Erie 15B with backhoe, exceptional 8,500.00
- Caterpillar D-8, 8R Series, DDPCU, hardly used 7,500.00
- Caterpillar D-7, 3T Series, with front PCU and D7N Hyster Winch, hardly used 8,500.00
- Caterpillar D-7, 6T Series, DDPCU, without blade but blade is available 8,500.00
- Caterpillar D-4, 2T Series, with blade 3,250.00
- Galion 8-10 Ton Tandem Road Roller powered by International diesel engine, power steering 4,000.00
- Chicago-Pneumatic 210 CFM Air Compressor, Caterpillar D4600 diesel, 1300 hours, on 4-wheel trailer 2,500.00
- T-9 Crawler with hydraulic Austin-Western swing crane 3,500.00
- GMC 2½ Ton 6x6 Trucks, with front winch, from 1,500.00
- GMC 6x4 Truck with 13 cubic yard Heil refuse body 1,950.00
- Water Tank Trailers, aluminum, 300 gallon, like new 350.00
- Hyster "Karry Krones", 5 ton, pneumatic tires, perfect yard cranes, excellent condition 3,950.00
- Clark, Towmotor, Ross & Hyster Lift Trucks, solid and pneumatic tires, 2000# to 15,000# capacity. From 800.00

All Prices F.O.B. Cleveland, Ohio

We Have More Equipment But We Cannot List All Of It.

Please Contact Us For Your Requirements. Photographs Sent Upon Request.
Evenings Call Mr. M. Nollish, EVERgreen 1-7338

THE U. S. TRUCK SALES CO.

1750 East 55th St. — Phone: UTah 1-0400
CLEVELAND 3, OHIO

FOR SALE

Barber-Greene 840 B Plant Continuous mix: 20 to 45 tons per hour
Bros HO-20 Hot Oil Heater
10,000 gallon Storage Tanks
All new in 1955.

Particulars and prices upon request:

S. T. CHANAK & SONS
4422½ First Avenue South
HIBBING, MINNESOTA

STEEL SHEET PILING

418 PCS. BETH. AP-3 - 20' and 25'
160 PCS. BETH. DP-2 - 30' and 40'
900 PCS. LARSEN II - 30' and 40'
STOCKS AT NEW ORLEANS & JACKSONVILLE
ALL SECTIONS - BOUGHT, SOLD, RENTED

PILE HAMMERS & EXTRACTORS

MC KIERNAN TERRY E4 EXTRACTOR
MC KIERNAN TERRY 9B 3 HAMMER

THE SEABOARD STEEL CORPORATION
Tel. Ringling 7-0461
4521 South Tamiami Trail
SARASOTA, FLORIDA

FOR SALE

Five Euclid Model 8TDT

TRACTORS

(Cummins 300 HP Engines) with SH Scrapers. Scrapers have sideboards.

These machines were purchased new in 1952—they were overhauled in the winter of 1956, and have worked one season. Just traded-in on new equip.

WRITE OR CALL:

Dean-Hobson Equipment Co.
Caterpillar Dealer

2131 Washington Street
KANSAS CITY, MISSOURI
Phone: HArrison 1-6488

DEPENDABLE USED MACHINES

Barber-Greene asphalt paver
Koehring 604 crane
Pioneer port. gravel plant
8-G #358 hopper car unloader
Cietrac with 1½ yd. loader
17 Pioneer conveyors, 18" to 30"
TRACTOR & EQUIPMENT CO.
10032 Southwest Highway, Oak Lawn, Ill.

FOUR CRANES & SHOVELS

Marion "331" ¾ yd. Shovel or Dragline.
Insley "L" ¾ yd. Crane or Dragline, 1952 Model.
Unit "514" ½ yd. Trench Hoe, fair condition.
Unit "514" ½ yd. Dragline, 30' Boom w/ Bucket.
Link-Belt. Shovel Attachment complete for LS-85 (¾ yd.)

FIVE TRANSIT MIXERS

Jaeger 3 yd. (4¼ yd. agitator) (Hi-Discharge, on 1950 International LF170 Tandem.
Jaeger 3 yd. (4¼ yd. agitator) (Hi-Discharge, 1945 model, mounted on 6-wheeler.
Smith 3 yd. (4¼ yd. agitator) Hi-Discharge, un-mounted.
Rex 3 yd. (4¼ yd. agitator) Hi-Discharge, mounted F-8 Ford Tandem.
Rex 5½ yd. Demonstrator Adjusta-Wate Mixer, mounted RF192- International Tandem Axle Truck.

SIX LOADERS

Pettibone "175D" Demonstrator 1¾ yd. Diesel Tractor Shovel, 4-Wheel Drive, power shift transmission. Priced to sell.
Caterpillar "D-6" Diesel Tractor w/Hi-Lift Cable Traxcavator, 1950 model in fine shape.
Cietrac "DGH" Gas Crawler w/Drott Hi-Lift 1½ yd. Loader. Buy for repairs or to fix up—at your own price.
Allis-Chalmers "HD5" Fron End Loader, 1952 Model.
International "TD9" Drott Hydraulic Front End Loader—Excellent.
Haiss "75C" Used Crawler Bucket Loader.

MISCELLANEOUS

Parsons "21" Ladder-type Crawler-Mounted Trenching Machine—digs 9' deep.
Pettibone-Wood "820A" New Windrow Proportioner. Reduced for quick sale.
Pettibone-Wood "840A" New Windrow Spreader Box. Offered at discount.
Pettibone-Wood "P620" Used Preparer, G-M Diesel Power. Will rent or sell.
Bayport 21 yd. New Aggregate Bins.

NOTE: All This Equipment Located in our Yard.

EIGHMY EQUIPMENT COMPANY

120 S. Pierpont Phone 4-6706
ROCKFORD, ILLINOIS

FOR SALE

MANITOWOC Dragline, 130' boom, 5 yd. bucket, Price on cars \$84,000.00.
BUCYRUS-ERIE Dragline, 140' boom, 8 yd. NORTHWEST model 80D Shovel, 2½ yd. new in 1953. Price \$26,300.00 on cars
NORTHWEST model 80D Shovel & Drag now in 1951. Price \$30,500.00 on cars
BUCYRUS-ERIE Shovel 54B 2½ yd., 2½ yrs. old

WILLIAM LUBRECHT, III

311 W. Diamond Ave., Hazelton, Pa.
Phone: Gladstone 3-0401 or 3-0253

WE ARE OVERSTOCKED ON THESE ITEMS

Will sell at bargain cash prices or trade for other late model equipment. Every item guaranteed.

- 15—D8 Caterpillars with Trackson Side-booms
- 20—D7 Caterpillars with Trackson Side-booms
- 4—D6 Caterpillars with Trackson Side-booms
- 2—D7 Caterpillar Backfillers
- 12—HD19 Allis-Chalmers Sideboom Tractors
- 6—D8 Caterpillar Angledozer
- 20—D7 Caterpillar Angledozer
- 5—51 Buckeye Trenchers
- 2—48 Buckeye Trenchers
- 2—320 Cleveland Trenchers
- 7—K12 Insley Cranes & Backhoes
- 2—22B Bucyrus-Erie Cranes and Backhoes
- 2—34 Lima Cranes & Backhoes
- 4—500 CFM Gardner-Denver Compressors with D13000 Cat engine
- 35—300 Amp. Lincoln Welders with GM 271 Diesel

Located Houston, Texas; Wyoming, Montana; North Dakota, Ohio, South Carolina.
We have in stock a large quantity of various winches, buckets, shovel and backhoe attachments allied to above equipment.

We buy, rent, sell and trade

BRAZOS EQUIPMENT RENTAL COMPANY

P. O. Box 8157 3200 Wheeler St.
HOUSTON 4, TEXAS
JAckson 8-5475

FOR SALE VERY CHEAP

Bulldozers, Angle & Straight, Cable Controls & Hydraulic Attachments.

Wrecking Now - Following Tractors For Parts:

Caterpillars: D-2, D-4, D-6, D-7 and D-8
Allis-Chalmers: HD-7, HD-10, HD-14, L & S
Internationals: TD-9, TD-14, TD-18
Cletracs: All Models

We now have operating latest type automatic track, roller and idler rebuilding equipment. We can furnish rebuilt tracks, rollers and idlers at lowest prices. Bring or send your old track, rollers and idlers for credit on exchange. Also, can rebuild yours, at greater savings. Fully guaranteed - Quality workmanship.

Also Parts and Tires for Allis-Chalmers, Caterpillar, Adams, Motor Graders.

WE TRADE - WE BUY - WE SELL

1957 Catalog Now Ready
Send 25c - Refundable.

SURPLUSTRACTOR PARTS CORP.

2745 Main Ave. - Phone 5-8511, 2-9312
Fargo, North Dakota

BUCKETS

- 2 Yard R.C. PAGE Dragline.
- 2 1/2 Yard ESCO Dragline.
- 2 1/2 Yard HENDRIX Dragline.

PRICED TO SELL.

Anderson Equipment Co.

P. O. Box 1737 - Pittsburgh 30, Penna.
Phone: LEhigh 1-6020

USED MACHINERY FOR SALE or RENT AND RENTAL with OPTION to PURCHASE

The following used machinery is offered, subject to prior sale, f.o.b. Omaha, Nebraska, unless location is stated otherwise. All machinery listed herein is in running condition and is in the condition as described opposite each item. Our surprisingly LOW prices will be furnished to interested parties on request. Photos of equipment are available as well as options for inspections.

- 1 Used Barber Greene Model 839-840 Single Aggregate Maintenance Asphalt Plant consisting of:
 - 1 Model 840 Mixer No. 840-49-10 powered with Le Roi gasoline engine.
 - 1 Model 839 Dryer #839-840 complete with Dust Collector and Elevators.
 - 1 Model 811A Fines Feeder
 - 1 Three compartment Cold Bin with 812 Feeder No. 812-49-18.

Can be quoted—As Is or Reconditioned
- 1 Used Barber Greene Model 879A Asphalt Finished with (2) 1' extensions powered with Le Roi gasoline machine engine Serial Number 879-48-125. This machine is in running condition.
- 1 Used Barber Greene Model 879 Asphalt Finisher with (2) 1' extensions powered with Le Roi gasoline engine. Machine Serial No. 879-8-35. This machine is in working condition.
- 1 Used Huber 8-10 Ton Tandem Roller Serial No. 5T-383. Machine is in good working condition. Motor rebuilt.
- 1 Used Huber 8-10 Ton Tandem Roller Serial No. 5T-624. Machine is in good working condition.
- 1 Used Cleaver-Brooks 82 H.P. Steam Generator, Skid mounted powered with Waukesha 4 cylinder gasoline engine. Machine complete reconditioned with spare short block for Waukesha gasoline engine. No. 0-11236. F.O.B. Harlan, Iowa
- 1 Used Cleaver-Brooks 42 H.P. Steam Generator, Pneumatic Tired mounted, air cooled engine driven. Just out of boiler, Shop #4612-53.
- 2 Used Bros 26T 26 H.P. Steam Generators Pneumatic Tired Mounted, Wisconsin engine driven. Just out of Boiler, Shop No.'s 3129 & 3135.
- 1 Used Buffalo-Springfield 7 ton Tandem Roller, open rolls powered with 4 cylinder Hercules gasoline engine, Working condition. No. 13529.
- 1 Used Hetherington-Berner Three compartment bin with three gate reciprocating feeder. 35 ton used 2 years, like new.
- 1 New yard worn Dug-Lynn Model 8 Tru-Lay Paver, Yard worn. Literature attached.
- 2 Used Rex 3 yard High Discharge Moto Mixers, separate engine drive, large water tanks, in good working condition.
- 4 Smith 3 yard High Discharge Truck Mixers, separate engine drive, water tanks, in good working condition.
- 2 Rex 2 yard High Discharge Moto Mixers, large water tanks, in good working condition.
- 1 Smith 4 1/2 yard High Discharge Truck Mixers, flush tank, fair condition.
- 1 TD-6 International Tractor with Bucyrus-Erie shovel loader, good working condition.
- 1 Barber Greene Model 661 Coal Conveyor, self propelled, electric power with 200' electric cable in good working condition.
- 1 Kiesler 1 1/2 yard Clamshell bucket, in excellent condition.
- 1 Unit 1/2 cu. yd. Clamshell Lifting crane, gasoline engine power, in good condition.
- 1 Shovel Attachment for 205A Koehring Used only once on dirt excavation. Like new.

FUCHS-CLAYTON MACHINERY COMPANY

901 South 40th Street
OMAHA, NEBRASKA

Phone HA. 8733

Western Union "FHZ"

USED EQUIPMENT

- 3—LeTourneau - Westinghouse Model D Tournapulls. Excellent condition throughout.
- 1—LeTourneau - Westinghouse Model C Tournapull, 24x25 (24 Ply) Tires; new in 1956. Very low hours.
- 1—LeTourneau - Westinghouse Model C Tournapull, 24x25 (24 Ply) Tires; new late 1955. Very low hours.
- 1—Euclid Model S-7 Motor Scraper. Like new, total operating hours 920. Has been factory modified.
- 2—LeTourneau Standard Model Super C Tournapulls with LS Scrapers.
- 2—LeTourneau Model M Scrapers, 7 yard capacity.
- 1—LeTourneau Model J Scraper, 9 yard capacity.
- 1—International TD-19 Tractor with Hydraulic controlled Garwood Scraper.
- 1—Woolridge Scraper, 12 yard capacity.
- 1—Allis-Chalmers Model HD-19 Tractor, with Double Drum PCU, Push Block, Engine completely overhauled, Rollers, Rails, etc. Good.
- 1—Model L Insley Backhoe.
- 1—International Model ID-6 Tractor, Industrial Type, Rubber Tires.
- 1—Oliver Model 900 Tractor with 4½ yard Hydraulic LaPlante Choate Scraper.
- 1—Tilt Trailer, adapted to pull with dump truck or similar equipment, excellent for hauling anything up to HD-10, D-7, etc.
- 1—Jaeger 27' Finishing Machine with transportation rig.
- 1—1950 Chevrolet Truck with Jaeger Mixer.
- 1—Rex Model 160S Pumpcrete Single with Remixer with Continental Gasoline Engine Model F 186. 800 lineal feet of 6" O.D. Pipe.

MILLER MACHINERY INC.

7255 W. Washington St.
Indianapolis 21, Indiana
Ph. CHapel 1-2511

FOR SALE

- 1 - G.M. 6-110 Diesel Marine - rebuilt - 4.5:1 hydraulic reverse and reduction gear.
- 2 - G.M. 6-71 Diesel - rebuilt - originally in A.C. tractor.
- 1 - G.M. 4-51 Diesel - used - has torque converter.
- 1 - Buda 6DT-668 diesel - used - power unit, complete.
- 1 - Pair Chris Craft MLS & MISO gasoline marine engines - used - 1.5:1 reduction gear.
- 1 - 40 KW A.C. generator set - very little use - 115/230 volt, single phase. Waukesha gas or gasoline engine driven.

GENERATORS

New - (Old Stock)

- 1 - 20 KW A.C. - Delco 208/240, 416/480 volts, 3 phase, 60 cycles, single bearing, 1800 RPM.
- 1 - 30 KW D.C. - Delco - 120 volt, 250 amp., 2 wire. Approved for marine use.
- 1 - 10 KW D.C. - Burk - 120 volt, 83.3 amp., 2 wire. Approved for marine use.

GREAT LAKES DIESEL CO.

1064 West 11th Street
Cleveland 13, Ohio
Authorized General Motors Diesel Distributor.

TANK TRAILERS

- 1 - 8,000 Gal. tank train (semi & 4 wheeler) constructed to haul isopentane or gasoline (one compartment each).
- 1 - 8,000 Gal. gasoline tank train.
- 2 - 5,000 Gal. tandem axle gasoline tank trailers.
- 1 - 4,000 Gal. tandem axle gasoline tank trailer or equipped with air cooled engine for refueling & defueling - has full platform on top of tank to service aircraft - meters, hoses, etc.

Several single axle gasoline trailers 1,500 gal. to 4,000 gal. capacity.

LAPINE TRUCK SALES

4830 Warner Road - MI 1-4260
CLEVELAND 25, OHIO

FOR SALE

1956 Diamond Model #77 Portable Gravel Plant

1954 Parsons 250-2A Trench liner

1956 Model 44 Lima Hoe Dragline Combination

1 set Howe Truck Scales

Miscellaneous buckets, bulldozers, trucks, loaders and etc.

E. P. BRADY CO.

1115 So. Dort Highway
Flint 3, Michigan

BRIDGES FOR RENT

BAILEY STEEL TRUSS TYPE
VARIABLE SPAN & CAPACITY
FULLY PREFABRICATED, PORTABLE
CANTILEVER ERECTION

Construction by-passes Contractors access
Emergency detours Erection bridges
Falsework trusses Traffic separation

BAILEY BRIDGE EQUIPMENT CO.

1767 Conjeo Ave., San Luis Obispo,
California

MIXER

65 WORTHINGTON on 2 Pneumatic Tired Trailer. 4 Cyl. LeRoi Engine, Power Loader & Water Tank. Excellent condition. PRICE \$850.00.

Anderson Equipment Co.

P. O. Box 1737 - Pittsburgh 30, Penna.
Phone: LEhigh 1-6020

FOR SALE

1. PAGE DRAGLINE MODEL 618, Serial 239, new 1950, 130' Boom, 320 HP Diesel engine. Excellent condition.
2. P&H DRAGLINE MODEL 1055 L. C., Serial 11370, Cat. Diesel Model 375, electric swings, 80' drag boom, independent boom hoist for steel erection, 3½ drag line bucket. Can furnish shovel attachment.
3. BUCYRUS ERIE 54B, dragline Buda diesel, Serial 34000 series, 85% new condition. Can furnish coal stripping Hy Front Shovel attachment.
4. OSGOOD CRANE on Hoe Model 805, 1¼ yd., Cat. 13,000 diesel, 85% new condition.
5. LORAIN 79, 1½ yard Crane, drag and shovel. Cat. D13,000.
6. D8 Le Tourneau ANGLE DOZER, A-1. Has only 1,000 hours.
7. D7 LE TOURNEAU STRAIGHT DOZER.
8. D4 HYDRAULIC DOZERS, wide gauge.
9. CAT. #12 GRADER.
10. CAT. D6 CABLE STRAIGHT BLADE.
11. GALION TANDEM GRADER, Diesel-A1.
12. 2 BAY CITY TRUCK CRANES. Excellent condition, Model T50 & T40.
13. KOEHRING 304 CRANE or SHOVEL.
14. LORAIN TL 20, self propelled, GM Diesel, like new.
15. NORTHWEST 25 Crane and Drag, Diesel.
16. GALION 8-12 Ton three wheel roller.
17. D7 HYSTER WINCH, new.
18. LORAIN L-41-A CRANE and DRAGLINE, Cat. Diesel Motor 90% new.

TESTA BROS., INC.

6801 Richmond Rd.
Bedford, Ohio
Phone Bedford 2-5151

FOR SALE

LATE MODELS MIDWEST LOCATIONS
Manitowoc 3000-B's, 3500's erect cranes — shovels, long booms, wide long cats diesel. Also 2000-B's.
Northwest 6's, 80-D's, and 95 cranes — drags — shovels, diesels, wide long cats — long booms. Ind. BH's.
Bucyrus-Erie 38-B's, 51-B's, 54-B's, cranes — drags, shovels, diesels, wide long cats — long booms.
Marion, Koehring, Link Belt & Lorain models cranes — drags — shovels, wide long cats — diesels. Also backhoe equipped machines, all types.

JAMES C. FRENCH

226 Berry Pkwy. - Talcott 3-4927
PARK RIDGE, ILLINOIS

SHOVELS & CRANES

- 1—Lima 1201, 3 yd. Diesel Shovel and Crane—1950.
- 1—Lima 802 Diesel Crane—1952—130' boom.
- 1—Lima 604 Diesel 1½ yard Crane.
- 1—Northwest 80D Diesel Shovel and Crane—2½ yard.
- 1—Northwest 78D—Diesel Shovel—2 yd.
- 1—Osgood 1¼ yard Crane—40 ton—130' boom—1948.
- 1—Osgood 1½ Diesel Shovel—1953.
- 1—Osgood 1¼ yd. Diesel Shovel—1953.
- 1—Lorain 820 Shovel and Crane—2 yard—1948.
- 1—Lorain 50—1 yard Shovel and Crane—1951.
- 1—Lorain TL-25 Diesel Shovel & Backhoe—1953.

BULLDOZERS & LOADERS

- AC Model HD-15 Allis-Chalmers—3 yd. Shovel Loader—1953—Rebuilt.
- Caterpillar D4 Shovel Loader—1954.
- Caterpillar D6 Bulldozer—1955.
- Caterpillar D7 Bulldozer—1954.

RAE STEEL CORP.

135-24 Roosevelt Ave. - HI 5-0880
FLUSHING 54. NEW YORK

FOR SALE DIESEL LOCOMOTIVES

- 2—10 ton Plymouth, Model DHD; 40½" gauge, Four Wheels, Serial #5207 and #5208. New 1946.
- 1—10 ton Plymouth, Model DHDX; 40½" gauge, Four Wheels, Serial #5412. New 1949.

These units are fully equipped and can be adjusted so they can operate on 36" and 42" gauge by shifting the wheels on the axle in or out. Additional information on request.

Philadelphia Transformer Co.

Box 566 Dalton, Pa.

TRUCKS WANTED

Highest dollar value paid for new and used trucks and all kinds of used equipment. All types of truck equipment bought and sold, including war surplus.

Write, phone or wire:

BILL FISHEL

Vandeventer Auto Sales

717 So. Vandeventer St. Louis 10, Mo.
Ph. Franklin 1-1750

CYLINDER HEAD REBUILDING SERVICE

CRACKS REPAIRED
MACHINED READY-TO-INSTALL
VALVE GRINDING
PRESSURE AND MAGNETIC TESTING
INTERNATIONAL
CATERPILLAR
G. M. C.
BUDA
etc.

GAS AND DIESEL

CHAPIN CYLINDER HEAD CO.

9 miles west of Jacksonville in
CHAPIN, ILL. PHONE #3

BUY of the YEAR

In loading equipment



Rugged Box-Type

Construction Permits

Amazing Low Price

The KOLMAN "Junior" Conveyor is designed to meet the demand for a LOW COST portable conveyor rugged enough to support a Loading Trap and large Vibrating Screen. The "Junior", or Model 202, will take the kind of punishment that is dished out to a portable outfit—and will cost you less money to own and operate!

The rugged "box type" construction of the "Junior" gives you unusual strength and rigidity for such low prices. The sides are of fabricated 3/16" steel plate formed into a channel 18" deep with 2" legs. A steel belt cover completely covers the top, giving additional rigidity and completely encasing the return belt so as to prevent material from working in to cause belt damage.

The under-slung power unit provides easy access for operation and servicing.

Self-cleaning tail pulley, bar type head pulley, ball bearings throughout and heavy duty truck axles and tires are included to give it the biggest combination of fine features to be found anywhere in the low price field.

SEND for FREE literature

KOLMAN Manufacturing Co.

5200 W. 12th St., Sioux Falls, S. D.

Please send literature on—

- () Model 101 Heavy Duty Conveyor
 - () Model 202 Junior Conveyor
 - () Screens () Feeders () Traps
- Quote size or capacity

Name.....

Address.....

City.....

WE ARE NEVER UNDERSOLD, OVER 2 MILLION DOLLARS EQUIPMENT IN OUR YARD

- 5, D-6 9U Series, Blades & Drums
- 7, D-8 2U Series, Blades & Drums
- 4, HD-5's Blades & Drums
- 4, TD-14's Blades & Drums
- 5, Graders
- 14, Side Boom Cats. HD-15A, HD-19, D-7, D-8, TD-14A & TD-18A.
- 80, Tractors to choose from.
- 12, Crane Shovels & Backhoes, ¾-yd. to 2½-yd.
- 1, Cleveland Trencher Model 320 with Caterpillar Diesel engine. Machine completely rebuilt.
- 1, Buckeye Model 51 Trencher Caterpillar Diesel engine. Machine completely rebuilt.
- Welders, Compressors, Water pumps, Beveling machines, Pipe Tongs, belts and complete equipment for laying gas pipe.

We Have It Or Can Get It!

BUYER FINDERS

8660 East Marginal Way

Seattle, Washington

MO. 2010

EQUIPMENT FOR SALE

Osgood Model 200 with ½ yard backhoe stick and bucket, also crane boom and ½ yard drag bucket and frost breaker, make offer—in good running condition, 3½ years old and overhauled.

Also, D4 endloader, overhauled, in good running condition.

RIEMER BROS., INC.

9800 W. Waveland Gladstone 5-6330
SHILLER PARK, ILLINOIS

TRUCK MIXERS

- 2—REX 3 yard Horizontal. Each ...\$1,250.00
 - 2—JAEGER 3 yard Horizontal. Each 1,250.00
 - 2—REX 3 yard Horizontal, mounted on White trucks. Each 2,500.00
- All above are 1949 machines and in good condition.
- 2—4½ yard JAEGER Mixers, with jacks. 1953 Machines, condition Excellent. Each 4,000.00

ANDERSON EQUIPMENT CO.

P. O. Box 1737 - Pittsburgh 30, Penna.
Phone: LEhigh 1-6020

CLEARING HOUSE SECTION

CALL UPON **MUTUAL** FOR THE NATION'S LARGEST

PARTS STOCK

Headquarters All Heavy-duty Equipment, Supplies & Parts

• DUMP TRUCKS • LOADERS • CRANES • ENGINES

Lowest Prices - Complete Satisfaction Guaranteed

NEW and Guaranteed REBUILT ENGINES

Completely Dynamometer "Run-in" and Tested in our own modern, extensive rebuilding shops.

- HERCULES
- CUMMINS
- CONTINENTAL
- WAUKESHA
- GMC DIESEL

QUALITY — SERVICE — ECONOMY



2000 S. WABASH AVENUE
CHICAGO 14, ILLINOIS

Telephone: CAlumet 5-3500

20% OFF ON ALL NEW PARTS

Complete coverage for Caterpillar and partial coverage for Allis-Chalmers and International Road Building Equipment. We buy in huge quantities so we are able to offer these tremendous discounts. All parts are sold on a money-back guarantee. 95% of our parts are GENUINE. All sales are cash. Order by part number. Prices based on your dealer's list price - Less 20%.

50% DISCOUNT ON ALL USED PARTS

Dakota Tractor & Equipment Co.

West Main

Fargo, North Dakota

JOHN P. TOLP & SON'S

Hydro Crane Rentals
24 Hour Service

5138 W. Hirsch Street
Chicago 51, Illinois
Phone: TUxedo 9-0918

FOR SALE

3 LeTourneau-Westinghouse
"C" Tournapulls, Ser. Nos.
GT-6042-45-46, used 1800
hours. Good Condition. Ea. \$14,000.00

1 Cat D-8 Tractor with angle
dozer blade, two years old. 18,000.00

**Wilson Machinery &
Supply Company**

Lexington, Ky. - Phone: 3-1455

DW21 Movall Sale

5 of the best rock and dirt hauling units in the business—C&D Movall "Positive Ejection" rear dump wagons powered by Caterpillar DW21 300 HP Tractors—Used an average of only 2500 hours. All necessary repairs made — Rubber very good. Painted and ready to work, heated Movall bodies and enclosed cab tractors.

Also have DW21 Tractors

REAL BARGAINS

PRICED TO SELL ! !

FOR FURTHER DETAILS WIRE OR CALL
RD 9-9951

V. S. JERRY & SONS CORP.

Caterpillar Dealer

Cat and Caterpillar are Registered Trademarks
P. O. Box 158 - Massena, New York
of the Caterpillar Tractor Co.

FOR SALE

D-4 Caterpillar with Trackson
Loader, with 2 Buckets & Dozer
Blade. Very reasonable.

Deere 420 Crawler, w/Henry Load-
er, used only 200 hours.

1940 IHC TD35 in good condition,
\$1,100.00.

Brand New Hopto Model 120 Back-
hoe Mounted on 1½ Ton Truck;
Ready to go.

New Deere 420 UM Trench Hog
Trencher and front end dozer.

New Deere 420 Crawlers, with in-
dustrial loaders.

New Jeep-A-Trenchers, New Hop-
to Backhoes.

For real buys—see

MARTIN IMPLEMENT COMPANY
Roanoke, Illinois

ONE MAN and a MAINCO WHEEL can
beat 2 MEN using CHAIN or TAPE!

MAINCO
DISTANCE
MEASURING
WHEEL



Send for
descriptive
folder.

THE MAINTENANCE CO., INC.
Dept. "D", 453 W. 42nd St., N. Y. 36, N. Y.

FOR SALE

- 1—Link Belt Speeder Model L585 Shovel & Backhoe Serial #7A1226, Year 1949, w/Cat. 318 Engine ..\$10,500.00
- 1—Bros. 50 ton rubber tired compactor year 1954, Serial #GPR3060, Model 450. Used very little.\$ 7,500.00
- 1—Chester 60" double drum tamping roller, w/8" wedge feet. Used approximately 2 months. Year 1954\$ 3,000.00
- 3—Caterpillar DW 10 w/Athey Side Dumps, Serial #1V1498, 1V1455, 1V1497, Year 1950, Cat. 318 Enginesea. \$ 9,000.00
- 1—Link Belt Speeder, Model K370 w/-shovel front 1 3/4 c.yd. bucket and 70' crane boom, powered by D13000 Cat. Engine, Serial #2533, Year 1946.\$20,000.00

All reasonable offers will be considered.

**CAMPANELLA & CARDI
CONSTRUCTION CO.**
780 Jefferson Blvd.
Hillsgrove, Rhode Island
Ph. Regent 7-1300

We do a Nation-Wide business in

STEEL SHEET PILING

AVAILABLE IMMEDIATE SHIPMENT

380 pcs. 60 ft. Beth. DP-2—New York
282 pcs. 60 to 90 ft. Carn. M-116—Illinois
360 pcs. 60 to 90 ft. Beth. ZP-35—Maryland
180 pcs. 60 ft. Carn. M-115—Illinois
111 pcs. 45 to 40 ft. Carn. M-116—Alabama
490 pcs. 42 ft. Carn. M-116—Louisiana
244 pcs. 35 ft. Carn. M-116—Wisconsin
290 pcs. 35 to 15 ft. Beth. AP-3—Ohio
190 pcs. 25 ft. Beth. DP-2—Massachusetts

Other lengths and sections new and used at other locations in the United States

**McKiernan-Terry and Vulcan Pile
Hammers and Extractors
Boilers, Hoists, Derricks, Cranes
Compressors, Railroad Equipment,
Etc.**

Regardless of location of job, write,
wire or phone

MISSISSIPPI VALLEY EQUIPMENT CO.
1906 Railway Exchange Bldg.
St. Louis 1, Mo. Chestnut 1-4474

SAUERMAN DRAGLINE

FOR SALE

2-CU. YD. SLACKLINE CABLEWAY

With standard Sauerman 150 hp., 2-drum variable speed hoist, with 2-cu. yd. bucket and steel mast. Used on one job only.

AMBURSEN DAM COMPANY, INC.
295 Madison Avenue New York 17, N. Y.
Murray Hill 5-7757

FOR SALE

SCRAPERS

2 CAT DW-20's

2 C TURNAPULLS

TIRES & ENGINES IN VERY GOOD CONDITION

ALSO

- 1 ROME DISC HARROW
- 1 1956 INGERSOLL RAND 600 CFM DIESEL COMPRESSOR
- 1 1953 G.M.C. 1200 GALLON TANK TRUCK
- 2 60" DUAL CHESTER TAMPING ROLLERS
- 1 1956 PNEUMATIC TIRED TAMPO ROLLER
- 1 1956 CAT 12 MOTOR GRADER

EDDIE PAINTON ASSOCIATES, INC.

843 EAST 93RD ST.

CLEVELAND 8, OHIO

MULBERRY 1-8831

WANTED: 54B shovel attachment for coal stripping shovel, long boom and sticks, complete with lagging chains, trip mechanism, etc. Must be in good condition. Priced right. **TESTA BROS., INC.,** Richmond Road, Bedford, Ohio. Telephone BEdford 1-5151.

- 36 x 42 Buchanan Jaw Crusher
- 30 x 42 Buchanan Jaw Crusher
- 18 x 32 Telsmith Roller Bearing Jaw Crusher
- 14" x 26" Acme Jaw Crusher
- 10" x 20" Blake Type Jaw Crusher
- 9" x 36" Telsmith Wheeling Roll Br. Jaw Crusher
- #32 Telsmith Gyratory Crusher
- 16 x 24 New Holland Roll
- 18 x 30 Telsmith Roll
- 2—5' x 14' Tripple Deep Telsmith Screen
- 3' Symon Cone Crusher Standard Bowl
- 25" x 40" Cedar Rapids Jaw Crusher
- 13" x 30" Farrel Jaw Crusher
- 2' Telsmith Cone Crusher
- 10' Tandem Rome Diesel Scraper
- 1—100 K.W. GMC Diesel Generator Set
- 1—150 K.W. GMC Diesel Generator Set
- 16" Telsmith Gyratory Crusher
- 30" x 42" Pioneer Jsw Crusher and Feeder
- 36" x 30" Feeder
- 10" x 36" Cedar Rapids Crusher
- 10' x 30" Telsmith Rolls
- 10—16 Grindler Jaw Crusher
- 10—20 Grindler Jaw Crusher

Blue Ball Machine Works
Blue Ball, Pennsylvania

LIQUIDATION SALE

- 1 Lorain TL CAT 4400 Motor, Hendricks Drag bucket\$3,000.00
 - 1 CAT 7, 9G Series, LaT. Dozer, Double drum unit\$2,500.00
 - CHEV. '50 Model, 2-ton flatbed dump\$300.00
 - TOOLHOUSE TRAILER and 1000 gal. water tank with sprinkler\$400.00
 - '52 Model FORD Pickup\$450.00
- This is no junk. This equipment all in A-1 condition and may be seen working anytime in Shreveport, Louisiana.

Call: **DIRT CONTRACTORS, INC.**

R. E. GOWAN
2502 Coral St.
SHREVEPORT, LOUISIANA
Phone 65-5824 after 6:30 P.M. OR
Jack Kaplan 2-3248 days

ATTACHMENTS AVAILABLE

Northwest - Bucyrus-Erie - Lima - Marion - Link Belt - Lorain - P&H - Manitowoc. Rhovels - Backhoe - Clam Drag - all sizes.

JAMES C. FRENCH

226 Berry Pkwy. Tolcott 3-4927
PARK RIDGE, ILLINOIS

WANTED

"BUYERS FOR THE FOLLOWING EQUIPMENT"

- 2—Bay City 180T-50 Truck Cranes, 6x4.
- 1—Lorain TL-20 Self Propelled 6x4 Wagon Crane (Diesel).
- 1—Lima #34 Crawler Crane, 60' Boom (Gas).
- 2—Koehring 304 Crawler Cranes—shovel attachment available.
- 1—Northwest 25 Crawler Crane-Hoe Combination (Diesel).
- 1—Osgood 1½ yard Crane-Hoe or Shovel Attachment available.
- 2—Caterpillar D-7 Dozers—4T Series
- 2—Caterpillar D-4 Cable Dozers.
- 1—Caterpillar R-4 Dozer.
- 1—Caterpillar Model 12 Grader, large front tires.
- 1—Buffalo-Springfield 10 to 12 ton Tandem Roller (Diesel).
- 1—Galion 8 to 12 ton Three Wheel Roller.
- 2—D-7 Hyster Winches—\$995.00 each.
- 1—D-4 Hyster Winch.
- 1—Trailmobile 20' Tandem Dump Trailer.
- 1—200 H.P. Cummins NH Diesel Engine.
- 1—Heavy Duty Machinery Trailer with Hydraulic Gooseneck.

THE MAJORITY OF THE EQUIPMENT LISTED IS GOVERNMENT SURPLUS
AND ALL OF IT IS LOCATED IN CLEVELAND, OHIO

LAPINE TRUCK SALES

4830 Warner Road - Cleveland 25, Ohio - MI 1-4260

FOR SALE OR RENT

- 1—General Crane, Model 327, 50' boom, fairleads, G.M. Diesel engine. Complete overhaul, 1956.
- 1—Koehring, 605 Crane boom, 65', fairleads, counterweight. Good condition.
- 1—D-7, S/N 3T28562, equipped with 7S blade, and #25 cable control unit.
- 1—D-8, S/N 2U3928, equipped with #25 cable control unit and stationary push plate.
- 1—D-8, S/N 8R9935, equipped with stationary push plate.
- 1—HD-19, S/N 1541, equipped with stationary push plate.
- 1—Euclid Bottom Dump, Model 25 FDT, S/N 8866, Cummins Engine.
- 1—Euclid Bottom Dump, Model 25 FDT, S/N 5828, Cummins Engine.
- 1—Gallon Grader, Model 118, S/N 19983, GMD 4-71 engine.
- 1—Gallon Grader, Model 118, S/N 20546, GMD 4-71 engine.
- 1—LeTourneau carryall scraper, Model FPB, S/N #S-25893.

SMALLEY CONSTRUCTION SUPPLY CORPORATION

436 W. Market St. Celina, Ohio
Telephone 2381

FOR SALE

- 3 - Model B—Tournapulls
- 3 - Gar Wood Model 625 Scrapers - 25 yard capacity
- 3 - Model B—Tournapulls

All equipment in excellent condition, offered at attractive prices

FEHRS TRACTOR & EQUIPMENT CO.

1809-11 Cuming St.
Omaha 2, Nebraska

FOR SALE

ALLIS-CHALMERS AD40 MOTOR GRADER

Cab, heater, wiper, lean wheels, all hydraulic controls, 6 new 13:00-24 tires, GMC Diesel engine. Less than 1700 hours. Exceptionally clean, excellent running condition. Like new! Save \$5,000-98,000! My price\$11,500.00

JAEGER MODEL SPS-1

Aggregate Spreader, 6 cylinder Continental Engine. Rubber mounted, chain drive. Excellent running condition. A real labor saver and a good buy @.....\$3,500.00

HOUGH HF ¾ YD. PAYLOADER

Powered by Hercules gas engine, equipped with all weather cab, wiper and intake heater fan. Just installed brand new hydraulic pump. Very clean and in excellent running condition\$3,500.00

Ray W. Butler Construction Co.

638 So. Linden Ave. - Phone 3287
ALLIANCE, OHIO

Equipment Tax Depreciation Sale

1954-4W Pettibone Multiten Speedal - Front End Loader - #508	\$ 6,950.00
Jaw Crusher - 25x36 - Austin Western - R.B. with starters, Drives - 75 HP motor T.E.F.C. - Feeder and Hopper, Portable - excellent condition	10,000.00
Stedman Crusher - single cage 36" - Serial #1773 with 75 HP - 500 ring motor drives - starters	4,700.00
Jaw Crusher - 4" x 40" - Austin Western - R.B. - without motor	1,000.00
Gyratory Crusher - Allis Chalmers - Gates - Model 7½D, Primary with 50 H.P. motor - 44" opening	2,200.00
Nelson Bucket Loader - 1954 - Model II - 100 hr. use	3,000.00
Neiler - Huber - 10 ton Diesel - 3 wheel - Operating perfectly	2,000.00
Neiler Maintainer - front and center hyd. - grading blades	1,100.00
Barrel Screen - 14' x 4' - 3 heavy steel perforated jackets, chain drive	1,000.00
Spreader Box - good roads - Aggregate spreader - good	300.00
Bucket Elevator - 38" - Buckets 20' x 8' with motor and pulleys	1,100.00
Haise bucket loader - model 75, on crawlers - rebuilt engine	900.00

LIMESTONE DAYTON CO.

205 Olive Rd., Dayton 7, Ohio — ME 5223

USED EARTHMOVER TIRES

Spring Specials

New 1600x20-16 Ply Tires, \$250 each — never used.

Used 2100x25 Tires. Fair tread, no repairs. Guaranteed no holes, \$300 each.

Used 2100x24-24 ply tires. We have a number of these on hand at all prices. All are perfect without repairs or need for repairs.

Call Us Collect

NELSON TIRE SERVICE, Inc.

Giant Tire Headquarters For
New Tires, Used Tires and
Retreading

NELSON TIRE SERVICE, INC.

Winona, Minnesota
PHONE 2306

EUCLIDS

BOTTOM DUMP

- 6 - Model 71FDT
- 4 - Model 17FDT
- 1 - Model 6FDT
- 1 - Model 1FDT

Anderson Equipment Co.

P. O. Box 1737 - Pittsburgh 30, Pa.
Phone: LEhigh 1-6020

WIPING CLOTHS

WASHED and STERILIZED

BUY DIRECT and SAVE \$\$\$ FROM
AMERICA'S LARGEST PROCESSOR

SNOW-WHITE WIPERS	29c Lb.
KNIT-UNDERWEAR WIPERS	28c Lb.
NEAR WHITE WIPERS	24c Lb.
COLOR WIPERS	22c Lb.
TURKISH TOWEL WIPERS	40c Lb.
WHITE WASTE (Shredded)	19c Lb.
COLOR WASTE (Shredded)	15c Lb.

OTHER TYPES AVAILABLE WRITE OR PHONE FOR
FURTHER INFORMATION AND LARGER QUANTITY PRICES.

*All Wipers Are Washed, Sterilized and Packaged
in 25-lb. or 50-lb. Boxes
AND IN 100-LB. BALES*

Freight Prepaid on Shipments of 300 Lbs. and Over Anywhere in the U. S.

TERMS TO RATED COMPANIES

QUALITY AND SATISFACTION GUARANTEED

SANITARY WIPING CLOTH CO.

215 WEST THIRD ST.

PHONE . . . CHERRY 33159

DES MOINES, IOWA

Members of the Sanitary Institute of America

FOR SALE

1 Model 16-E KOEHRING TWIN-BATCH PAVERS. Serial No. 24066.
Each F.O.B. Omaha, Nebr. \$10,000.00 Equipped standard water tanks,
ad-mix distributor system; powered by General Motors Diesel model
2055, tires good condition. Machines fine condition.

ANDERSON EQUIPMENT CO., INC.

200 Merchants National Bank Bldg.

OMAHA 2, NEBRASKA

Phone HARney 2533

FOR SALE:

1 Used 2 Yard Lorain Shovel; Waukesha
Diesel; Serial #17192; 15 ft. Crawlers;
34 in. thread; New Drive Chains; New
Crow Chains; New Center Pin Bushings;
New Swing Pin Bushing; Rebuilt Sprockets.
Idlers, Rollers; All New Bushings and
Shafts; Factory Rebuilt Injection Pump;
New Air System; New Clutch; Body Clean.
No Dents. Photo sent on request. No
Trades; \$11,000.00 spent in repairs and
parts. Total Price, \$26,500.00 F.O.B. East
Hartford, Connecticut.

Brookside Const. Co., Inc.

382 Forbes St.
East Hartford 8, Conn.
Ph. BU 9-9201

SEAMAN ROTARY TILLER

GM Diesel Motor #4031C, Spec. 117,
Model #DMHD484-22KB, Serial #M-
2232, Unit #412348.

SCRAPER (LeTOURNEAU)

LS Carryall Scraper with 4-16:00x20 16
ply tires, 9 yard capacity, Serial #S-
32199-LS, length 29'7", width 9'10",
wheel base 17'7".

CEMENT SPREADER BOX

With Truck Hitch Attachment—Serial
#185, Model #C900. This Spreader Box
is one (1) year old and has been used
very little.

R. E. GADDIE, INC.
ROAD CONTRACTORS
P. O. Box 343 — Phone 6036
Bowling Green, Kentucky

CLEARING HOUSE SECTION

FOR SALE

DRAGLINES AND CRANES

1201 Lima Dragline, 85', 3 yard
955 P&H Dragline, 90', 2½ yard
54-B Bucyrus Erie Drag, 85', 2½ yard
K-595 Link Belt Drag, 75', 2½ yard
3500 Manitowoc Drag, 85', 2½ yard
802 Lima Cranes
3000-B Manitowoc Cranes

SHOVELS AND COMBINATIONS

1201 Lima Comb. Shovel-Crane
54-B Comb. Dragline-Crane
22-B Comb. Shovel-Crane
25 Northwest Comb. Shovel-Drag
80-D Northwest 2½ yard Shovel
44 Lima 1 yard Backhoe
LS-85 Link Belt 1 yard Shovel
320 General ¾ yard Shovel
34 Lima ¾ yard Shovel
22-B Bucyrus Erie Backhoe
Unit 1020 ¾ yard Shovel—1 year old

TRUCK CRANES, EUCLIDS, DRILLS, etc.

Bay City, Lorain, P&H, Northwest &
Osgood Truck Cranes
Euclid Trucks—27FD, 86FD, 2FD, 82FD,
36FD, 8TD, 63TD, 59TD, 60TD, 4-FFD
600 Reich Heavy Truck Mounted Rotary
Air Drills
58-BH Joy Champion Rotary Air Drills
42-T, 29-T & 27-T Well Drills
Davey Rotary Truck Air Drills
Mayhaw Rotary Truck Air Drills
Portadrill Truck Mounted Air Drill
Garwood, LeTourneau, Caterpillar, Euclid
& Bucyrus Erie Scrapers
Huber 3-5 ton Tandem Roller
Buffalo-Springfield 10 ton Roller
International Bulldozers
Caterpillar & Allis Chalmers Dozers,
Front End Loaders, Graders, Carryalls
Shovel, Drag, Crane & Backhoe Attach.
Drag & Dipper Buckets for most makes
and models.

**FRANK SWABB
EQUIPMENT CO., INC.**

313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa. GLadstone 5-3658

FOR SALE OR RENT

Christian 2D Hoist & Swinger, 138 HP
Buda Diesel Engine. 15,000# SLP.
Lidgerwood 2D Hoist & Swinger, 90 HP
Buda Diesel Engine.
2 100 HP Lucey Portable Horiz. Fire-
Box Boilers. 200 lbs. Oil Fired. ASME.
25 ton American Steel Guy Derrick.
30 ton Steel Stiffleg Derrick 125' Bm.
25 ton Ohio Diesel Loco. Crane 1947.
1½ yd. Northwest No. 6 Diesel Crane
1948.
1½ yd. Lima 602 Diesel Crane.
5 yd. Manitowoc 4500 Shovel-Dragline.
75 KW Cat. Diesel Generator 3/60/440.

WHISLER EQUIPMENT COMPANY
Affiliated With
**MISSISSIPPI VALLEY EQUIPMENT
COMPANY**

1906 Railway Exchange
St. Louis 1, Mo.

EQUIPMENT

AT BARGAIN PRICES—
As a Result of Jobs Completed

Located in Cincinnati, Ohio
and Knoxville, Tennessee

In Cincinnati call Jim Roberts or Clyde Brown, Sun Construction Company, Elm-hurst 1-3252—Mailing Address—P. O. Box 2736.

In Knoxville call Roy B. Madgett or Frank Diggs, 2100 Ailor Ave.

TRUCK CRANE
P & H Model 150-10 Ton, Heavy duty. Equipped with remote control, D.C. Generator for Magnet and Lighting, Ciam Shell attachment, 60 ft. Boom, New Tires, Excellent condition. Price—\$9,000.00

CRAWLER CRANE
Koehring—¾ Yard Backhoe, Model 304 equipped with Shovel-Dipper and Stick, 50 ft. Crane Boom. Excellent condition. Price—\$11,500.00

AIR COMPRESSOR
Jaeger, Model 250, C.F.M., Mounted on 4-wheel carrier, new tires. Powered by International Diesel Engine. Excellent condition. Price—\$4,200.00

AIR COMPRESSOR
Jaeger, Model 75, C.F.M.—Mounted on two-wheel carrier, New Tires, powered by Continental Gas Engine. Price—\$1,500.00

HOIST
Buck Model V2M, with 35 ft. Tower, 2000 lbs. capacity, Mounted on 2-wheel carrier with new tires. Price—\$2,000.00

CONCRETE MIXERS—5 ea.
Jaeger, Model 115 Bag, mounted on two-carrier, new tires. Powered by Wisconsin Gas Engine. Price—\$1,100.00 ea.

WELL TOWER
Archer, 117 ft. Heavy Duty, two-wheelbarrow platform. Price—\$2,500.00

Write for listing of over 100 other items we are offering for sale, at bargain prices.

BARGAIN

PAGE WALKING DRAGLINE

Model 621-S, Serial No. 176. Machine new in 1941, with 125 ft. boom, 7 yard Hendrix bucket, equipped throughout with air controls and the latest type of gears available for this type of machine.

EQUIPPED WITH TWO DIESEL ENGINES:
One 3 Cylinder—400 RPM—12½ x 16 Diesel Engine—#C69.
One 3 Cylinder—500 RPM—9½ x 12½ Diesel Engine—#C50.

Approximately \$6,000.00 worth of spare parts—mostly new.

Machine in good operating condition and has been maintained to high standard of operation. Located in Southern Illinois. Price upon request. This machine is a real bargain for anyone needing this type of machine.

H. E. PERSHING
P. O. Box 267—Phone 783
BOONVILLE, INDIANA

TRUCK CRANES FOR SALE

40 Ton Osgood Model 721, 1953
35 Ton P&H, Model 555, 1955
25 Ton P&H, Model 355, 1954
20 Ton P&H, Model 255A, 1952
25 Ton Link-Belt, Model 90, 1949
20 Ton Lorain, MC414, 1947
12½ Ton P&H, Model 150, 1948
7½ Ton P&H, MM, 1952

RAE STEEL CORP.

135-24 Roosevelt Ave. HI-5-0880
FLUSHING, NEW YORK

FOR SALE

- 1 - Willard Batching Plant Model GL - S/N 188 with Weigh Batcher and Ford Industrial 6 cyl. and Willard 24" Batch Conveyor, S/N 171 with 5 hp Electric Motor.
- 1 - Badger Model 303-3 Ditcher, S/N 374 Crawler mounted, good operating cond.
- 1 - Buckeye Model 120 Ditcher with Buda Model HD326 Gasoline Engine - 2 sets buckets - good operating condition.
- 1 - Buckeye Model 406 Trancher, S/N 48 - good operating condition.
- 1 - Hyster Model HW-Hystaway Dragline and Crane attachment, S/N 23828 for mounting on Caterpillar D7 or D8 - like new.
- 1 - Allis-Chalmers Model HD19G, S/N 2046 with 4 cu. yd. Front End Loader with Standard Bucket and Rock Fork. This tractor completely overhauled - new tracks, rollers, sprockets, idlers and engine, torque converter, transmission overhauled, new jack assemblies in loader - This tractor is in perfect condition.
- 1 - International Model TD14 tractor, S/N 10883-T4 with 180" swinging boom crane model MC2R, S/N 4686.

Pictures available - write, wire or phone.

BORCHERT-INGERSOLL, INC.

2161 University Avenue
St. Paul 14, Minnesota

(3) Northwest Model 6 with Murphy diesel engines; 1 with Cat. 13000 Army surplus. Priced about 70% below new cost.

80-D Backhoe attachment.

N. W. 6 Unused shovel attachment.

N. W. 25 Backhoe attachment.

Air Compressor Rental Company, Inc.

19615 Nottingham Road
Cleveland 10, Ohio
KENmore 1-8000

FOR SALE EUCLID REAR DUMP TRUCKS

Bucyrus-Erie Draglines, 2½ yd. to 8 yd.
Bucyrus-Erie Shovels, ¾ yd. to 8 yd.
Northwest Draglines, ¾ yd. to 2½ yd.
Northwest Shovels, ¾ yd. to 2½ yd.
Manitowoc Draglines, 2½ yd. to 5 yd.
Manitowoc Shovels, 2½ yd. to 5 yd.
Marion Shovels & Drags, 4 yd. to 9 yd.
Lima Shovels & Drags, 1½ yd. to 6 yd.
Osgood Shovels & Drags, 1½ yd. to 2½ yd.
Caterpillar Graders & Dozers.
Hi-Lift Shovels.
P&H Truck Mid. Crane & Hoe, ¾ yd.
2400 Lima Shovel front attachment.
4500 Manitowoc Shovel front attachment.
8" and 9" Drills, Diesel and Electric

other equipment available
not listed above.

WILLIAM LUBRECHT, III Construction Equipment

311 W. Diamond Ave. - Hazelton, Pa.
Phone: Gladstone 5-4641 or 5-0213

SHOVELS & CRANES

- 1 Ray City ½ yd. Crane, 30' boom tagline winder, Cat Diesel Engine. Good Condition \$ 8,500.00
- 1 Link-Belt LS-50 ½ yd. Backhoe and Crane, 35' boom, reconditioned 10,500.00
- 1 Link-Belt LS-85 Shovel, ¾ yd., with Cat D-8800 Diesel Engine record. Throughout 18,300.00
- 1 Link-Belt K-360 Combination Shovel and Crane, 60' boom, Diesel Engine, Good Condition 25,000.00
- 1 Link-Belt LS-90 Shovel, Cat D-318 Diesel Engine, 20 mos. old. 25,000.00
- 1 Unit Model 1020 ¾ yd. combination Shovel and Crane, 35' boom, tagline winder, GM Diesel Engine, reconditioned 13,500.00

Wilson Machy. & Supply Co.

Lexington, Ky. - Phone: 3-1455

CRANKSHAFTS

New Process Rotokrome Plated



CAMSHAFTS REGROUND



Connecting Rods Rebuilt

Rotary Process Hard Chrome—Magna-fluxing—Electric Heat Treating. Serving National Railroads, Bus and Truck Companies, including Diesel Equipped.

CLEVELAND HONE & MFG. CO.
8816 Harkness Rd., Cleveland 6, Ohio

Manufacturers' Literature

(Continued from page 203)

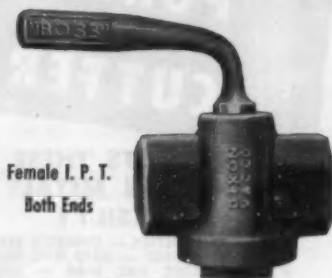
International Drott Skid-Shovels

Six new pieces of literature on International Drott skid-shovels and attachments are available from International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill. A 16-page, two-color general catalog covers the entire International Drott line, with on-the-job photos showing units utilizing various attachments, and diagrams illustrating the latest improvements. Other literature is an 8-page catalog describing the several sizes of log and pulpwood skid-grapples available, plus others.

For more information circle 169 on
Service Coupon Page 16 and mail now.

*Avoid One Cause
of Air Line Leaks
and Pressure Loss*

"BOSS" Self-Honing AIR VALVES



Female I. P. T.
Both Ends

Built to withstand the hard knocks of mining and construction service, "BOSS" Valves are also ideal for general use on pipe lines, hose lines, compressor tanks, etc., and for the handling of water. They do not require packing.

Bronze plug firmly seated by spring tension against harder metal of valve body is automatically honed to perfect seat as handle is turned. A straight, full-flow opening extends through valve body and plug, providing greater capacity with no friction loss. Valve opens or closes by a quarter turn of the handle.

INTERNALLY ATTACHED HANDLE—
In sizes $\frac{1}{4}$ " to $1\frac{1}{2}$ " valve stem and handle are combined in a strong one-piece forged steel unit which is anchored to the bronze plug within the valve body. This patented feature eliminates stem and handle breakage. Sizes $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ " and 2" have externally riveted handles.



Male I. P. T. Both Ends

Stocked by Manufacturers and Distributors
of Industrial Rubber Products

DIXON

Valve & Coupling Co.

GENERAL OFFICES & FACTORY—PHILADELPHIA 22, PA.
BRANCHES—CHICAGO—BIRMINGHAM—LOS ANGELES—HOUSTON
DIXON VALVE & COUPLING CO. LTD. TORONTO Associate Companies
Rex Box Company, Inc. Scranton, Pa. — Phoenix Brass Steel Company, Chandler, N.

... for more details circle 319, page 16
ROADS AND STREETS, April, 1957

With the Manufacturers and Distributors

G. A. GILBERTSON, president of the Frank G. Hough Co., was recently presented with a replica of one of the earliest coins found in the national collection of the French National Mint in Paris honoring the construction industry. The presentation was made by Messrs. Jacques Mantoux, Secrétaire General and Lucien Chretien, Directeur de la Société Decauville at a luncheon during the 1957 Road Show.

The original coin was requested by King Louis XIV to be struck in 1669 to celebrate the paving of the streets of Paris. The obverse side bears a portrait of King Louis and the reverse side has a symbol of construction and contains the inscription, "The town (Paris) is laid with new stone."

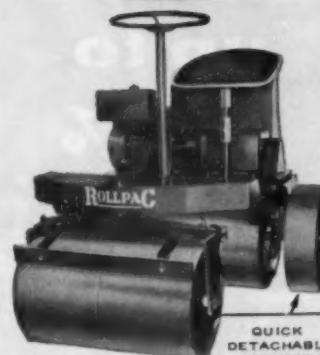
SHERMAN PRODUCTS, INC., Royal Oak, Michigan, is adding 30 per cent more floor space to its plant and offices on West Fourteen Mile Road. W. A. Romain, president of the firm which manufactures and distributes earth moving and materials handling equipment for tractors, said that most of the new space will be used for production of Sherman power diggers.

MOBILE DRILLING, INC., Indianapolis, Indiana, has purchased the Earth Drill business of the Buda division of Allis-Chalmers Manufacturing Company. Inventories are being moved to the Mobile Drilling plant in Indianapolis. Dealers who have been selling Earth Drills will be able to secure parts and service from Mobile Drilling. No other products of the Buda division or of Allis-Chalmers are involved in the transaction.

HOWARD MARRIOTT has been appointed eastern regional sales manager of Galion Allsteel Body Company, as announced by O. C. Henkel, vice president. In his new post, Marriott will coordinate the sale of Galion Allsteel dump bodies, hoists and hydraulic tailgates in his territory. His previous experience includes five years as sales engineer for a major truck equipment distributor in Cleveland.

AVAILABLE TRUCK COMPANY of Chicago has been purchased by Crane Carrier Corporation, Tulsa, Oklahoma, Robert L. Zeligson, president of Crane Carrier, recently announced. The Available Truck Company will be operated as a division of Crane Carrier. Acquisition of the Chicago concern is expected to boost CCC's 1957 annual sales to about \$10,000,000, double the 1956 total, according to Zeligson.

THE THEW SHOVEL COMPANY, Lorain, Ohio, manufacturers of Lorain power shovels and cranes, has established a new research and development department, according to an announce-



\$895.00

QUICK
DETACHABLE
EDGER WHEEL,
OPTIONAL

**A Standout One Ton Roller
in worldwide use by
Contractors, Paving Engineers
and Institutions.**

Ask To See It.

ROLCOR Industries

1208 2nd Ave. So., Minneapolis 3, Minn.
... for more details circle 286, page 16

Just out!

NEW David White CATALOG

First really new catalog in the instrument field. Contains complete, up-to-the-minute facts about the entire David White line of precision instruments... as well as news about some brand new David White products. Fill out the coupon—and mail today.



the sight
is right with a

DAVID WHITE

David White Instrument Company
2501 N. 19th Street
Milwaukee 5, Wisconsin

Please send the 1957 David White Instrument
Catalog to:

Name _____
Firm Name _____
Street Address _____
City _____ State _____

... for more details circle 314, page 16

CUT COSTS up to 20%



Fir Plywood concrete forms shave weeks off work schedules . . . cut form construction, erection and stripping time by as much as 20%. Can be used over and over. Every feature makes it ideal for faster construction. Fir Plywood is large, light, rigid, easy to work. Ideal for cost-cutting panelized form sections. Fir Plywood forms reduce finishing costs, too . . . form smooth, fin-free concrete surfaces.

specify **Fir Plywood**
CONCRETE FORMS



FREE: New portfolio to help you design and use fir plywood forms. Contains complete specification, construction and design data. (Offer good USA Only)

DOUGLAS FIR PLYWOOD ASSOCIATION
Dept. 139, Tacoma 2, Wash.

Please send new Fir Plywood Concrete Form Portfolio

Name _____
Firm _____
Address _____
City _____ Zone _____ State _____

... for more details circle 229, page 16
242

ment by E. C. Brekelbaum, vice president and assistant general manager of Thew. Brekelbaum also announced that Spencer Bowman has joined the company as manager of research and development and will head up the department.

The scope of the newly created department will include research and development of machinery for excavating and material handling and the investigation and application of new basic materials and manufacturing processes to the Lorain line.

J. W. GARDNER has been named coordinator of new products development for Gardner-Denver Co., Quincy, Illinois. Gardner will coordinate the work of all departments concerned with the development of new Gardner-Denver pumps, air compressors, rock drills, air tools and related equipment for the construction, mining, petroleum, transportation, manufacturing and process industries.

CLARK EQUIPMENT COMPANY has announced that it is building a 300,000-sq.-ft. facility in Chicago and expanding its construction machinery division plant in Benton Harbor, Michigan by 63,000 sq. ft.

The Chicago building, due for completion June 1, is a one-story, brick and steel structure in the Clearing industrial district, in a triangle formed by West 73rd Street, South Cicero Avenue and State Road. It has a rail connection with the Belt Railway of Chicago.

HENRY HARNISCHFEGGER, executive vice president of the Harnischfeger Corporation, has announced the appointment of Robert Losse as director of industrial relations and personnel. Losse, who will make his headquarters in Milwaukee, will be responsible for all personnel activities among the production, engineering, sales and administrative employees for all Harnischfeger plants.

M. J. WURZBACH has been appointed to the new post of staff director, product information, in the public relations department of United States Steel Corporation, as announced by Phelps H. Adams, executive director of public relations and assistant to chairman of the board. Wurzbach, a former Cleveland newspaper man, leaves the position of assistant district director of public relations in Cleveland to establish offices of the new section in Pittsburgh.

WILLIAM C. MARTIN, Sr., 57, president of United Steel Fabricators, Inc., Wooster, Ohio, died suddenly February 14. Mr. Martin was widely known throughout the steel industry, and in 1939 he was one of the founders of United Steel Fabricators, manufacturers of Wooster Metal Doors and many other fabricated metal products. He was formerly associated with the Kentucky state highway department and Republic Steel Corporation.

**WHEN THAT METAL
CUTTING JOB IS REALLY**

TOUGH!

Make it EASY!
(and cut costs)
with this . . .
**RUGGED
POWERFUL**



HKP
PORTER
HEAVY DUTY
CUTTER

**IT CUTS THESE
TOUGH METALS
EASILY!**

— HARD METALS — CONCRETE REINFORCING RODS — HARD WIRE ROPE — CHROME BALL WIRE — COLD DRAWN ALLOY STEEL — TEMPERED STEEL WIRE

Why fool around with other tools when the job calls for a PORTER HEAVY DUTY METAL CUTTER? Let those heat-treated, drop-forged, abuse-resistant jaws make the work easy, and less costly. Handles on 590HD size are all steel. This rugged, multi-job tool is designed for cutting the hardest bolts, rods and hard cable. Nothing better for construction companies and heavy industries.

**for CUTTING STEEL CABLE
and WIRE ROPE
use the
STEEL CABLE CUTTER**



The jaws in this shear-action, clean cutting STEEL CABLE CUTTER are notched to lock the cable in during cutting action to minimize crushing. For cutting soft or hard steel cable or wire rope up to 3/4".



**for CUTTING CHAIN
use the
HARD CHAIN
CUTTER — 590HC**

The right way to "cut" hard chain, alloy and case-hardened tempered spring wire and case-hardened bolts and screws is to crush (not cut) them with the center cut, round edge action of this PORTER HARD CHAIN CUTTER. Cuts one side of link at a time to prevent damage to tool. Capacities up to 1 1/2".

WRITE for catalog showing these and other PORTER METAL CUTTING TOOLS.

HKP

H. K. PORTER, Inc.
Somerville 43, Mass.

... for more details circle 282, page 16
ROADS AND STREETS, April, 1957

JOSEPH A. THOMAS, a partner of Lehman Brothers, has been elected chairman of the finance committee of the Flintkote Company, succeeding the late John M. Hancock, according to I. J. Harvey, Jr., Flintkote president. Thomas has been director of the Flintkote Company since 1936, except for a period during World War II when he was on active duty as a lieutenant and later as commander in the United States Navy. He is a member of the company's executive and stock option committees.

E. H. KLIEBENSTEIN Co., 1099 Hendricks Causeway, Ridgefield, N. J., has been named distributor for the complete line of Cleveland trenchers, sidecranes, backfillers and tampers for northern New Jersey. The distributor's territory includes the counties of Warren, Sussex, Morris, Union, Bergen, Hudson, Passaic, Essex, Hunterdon, Somerset, Middlesex and Monmouth.


SHAWNEE MANUFACTURING COMPANY, INC., Topeka, Kansas, has been sold to Stearns Manufacturing Company, Inc., of Adrian, Michigan, and will become a wholly-owned subsidiary of the latter firm, as announced by Marion Wills, president of Shawnee.

The Shawnee firm manufactures light earth moving tools and equipment, while Stearns is a leading maker of concrete block machines.

JAMES PATRICK (PAT) GODFREY has been named district representative for Erie Strayer buckets and bins in the southeastern United States. He will devote his time exclusively to working with distributors, original equipment manufacturers, and dealers in his territory, which will include Tennessee, North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi.

The Crest of
Good Living
comes to
New York

Hotel
New Yorker




JOSEPH MASSAGLIA JR., President
CHARLES W. COLE, Gen. Mgr.

34th Street at Eighth Avenue

Other MASSAGLIA Hotels . . .

• Santa Monica, Calif. Hotel MIRAMAR	• Washington, D.C. Hotel RALEIGH
• San Jose, Calif. Hotel SAINTE CLAIRE	• Hartford, Conn. Hotel BOND
• Long Beach, Calif. Hotel WILTON	• Cincinnati, O. Hotel SINTON
• Gallup, N.M. Hotel EL RANCHO	• Pittsburgh, Pa. Hotel SHERWYN
• Albuquerque, Hotel FRANCISCAN	• Denver, Col. Hotel PARK LANE

and in HAWAII . . .
Hotel WAIKIKI BILTMORE Honolulu

CHICAGO MIDWEST HEADQUARTERS
BOOKING OFFICE • 300 E. Walton DE 7-6344

World famed hotels—Teletype service—Television

WHAT ABOUT YOU. MR. READER?

Are you still active in the field? Have you moved or changed your position? Unless you send this information directly to us we can't be sure. Sometimes a reader's name is cut from the mailing list because we are not sure that our information as to name, title and address is right. *YOUR* name might be cut from the mailing list.

Don't Let This Happen to You

Even if you think we know all about you, please fill in the information requested below and send to us by return mail. Our auditors require proof of accuracy of our mailing list. *YOU* are the only person who can help us on this. Do it now before you forget, so you can be sure your magazine will always be properly addressed to you. New names cannot be added or old names retained on our list unless we have all this information. Please print or type.

ROADS AND STREETS

22 WEST MAPLE STREET, CHICAGO 10, ILL.

- ☐ I do receive ROADS & STREETS and wish to continue to receive it.
☐ I do not receive ROADS & STREETS but would like to have it.

DATE _____

NAME _____

TITLE OR OCCUPATION _____

FIRM NAME OR GOVERNMENT DEPARTMENT (give street address) _____

CITY _____
(If you have moved give old and new address)

ZONE (if any) _____

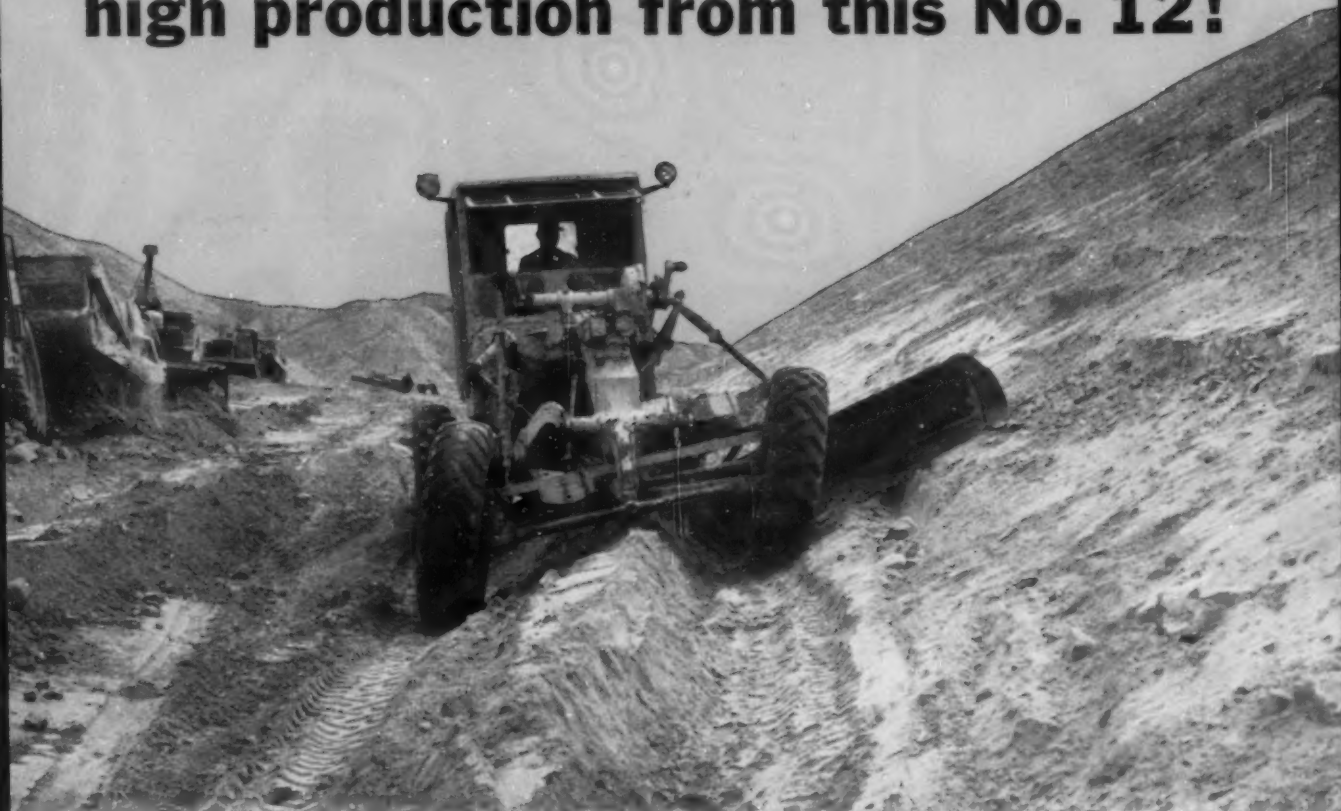
STATE _____

SIGNATURE _____

INDEX TO ADVERTISERS

- Air Compressor Rental Co., Inc. 240
 Allied Materials Corp. 145
 Allis-Chalmers, Construction Machinery
 Division. 70 & 71, 93, 127, 182, 204
 Ambursen Dam Company, Inc. 237
 American Bitumuls & Asphalt Co. 217
 American Bridge Division, United
 States Steel Corporation 195
 American Steel & Wire Division,
 United States Steel 124 & 125
 Anderson Equipment
 Co. 233, 234, 235, 238
 Anderson Equipment Co., Inc. 239
 Arrow Manufacturing Company 202
 Asphalt Institute, The 88 & 89
 Athey Products Corporation 159
 Atkinson Company, Guy F. 230
 Austin-Western Works Division,
 Baldwin-Lima-Hamilton Corp. 157
 Bailey Bridge Equipment Co. 234
 Baldwin-Lima-Hamilton, Construction
 Equipment Division 104
 Barber-Greene 208
 Barco Manufacturing Company 46
 Bartus, Edward 230
 Bethlehem Steel Company 3
 Blaw-Knox Company, Construction
 Equipment Division 80 & 81
 Blue Ball Machine Works 237
 Borchert-Ingersoll, Inc. 240
 Brady Co., E. P. 234
 Brazos Equipment Rental Company, 233
 Brookside Const. Co., Inc. 239
 Brunner & Lay Products 193
 Bucyrus-Erie Company 187
 Buffalo-Springfield Roller Co. 7
 Butler Construction Co., Ray W. 238
 Buyer Finders 235
 Campanella & Cardi Construction
 Co. 229, 237
 Caterpillar Tractor
 Co. 58, 63, 77, Third Cover
 Chain Belt Company 48
 Chanak & Sons, S. T. 232
 Chapin Cylinder Head Co. 235
 Chevrolet Division of General
 Motors 94 & 95
 Chrysler Corporation, Industrial
 Engine Division Second Cover
 Clark Equipment Company, Construc-
 tion Machinery Division 10 & 11
 Cleaver-Brooks Company 213
 Cleveland Hone & Mfg. Co. 240
 Cleveland Trencher Company, The. 194
 Clipper Manufacturing Co. 105
 Colorado Fuel and Iron Corporation,
 The Western Division Clinton. 27 & 28
 Colorado Fuel & Iron Corporation, The
 Western Division Grader Blades. 101
 Columbia-Geneva Steel
 Division 124 & 125
 Contractors Machinery Company 230
 D-A Lubricant Company, Inc. 146
 Dakota Tractor & Equipment Co. 236
 Dean-Hobson Equipment Co. 232
 Deatherage & Son, Geo. E. 229
 Dirt Contractors, Inc. 237
 Dixon Valve & Coupling Co. 241
 Dodge Trucks 189
 Dorsey Trailers 168
 Douglas Fir Plywood Association. 242
 Drott Manufacturing Corp. 102 & 103
 Eaton Manufacturing Company,
 Axle Division 152
 Eighth Equipment Company 232
 Elmco Corporation, The 84
 Electrovert 52
 Etnyre & Co., E. D. 212
 Euclid Division, General Motors
 Corporation 82 & 83, 87
 Fehrs Tractor & Equipment Co. 238
 Fishel, Bill 235
 Ford Division of Ford Motor
 Company 130 & 131
 Forke Brothers 231
 French, James C. 234, 237
 Fruehauf Trailer Company 32 & 33
 Fuchs-Clayton Machinery Company. 233
 Gaddie, Inc., R. E. 239
 Galion Iron Works & Mfg. Co., The. 139
 Gar Wood Industries, Inc. 200 & 201
 General Tire & Rubber Co., The. 44
 Goodrich Company, B. F., A Division
 of The B. F. Goodrich Rubber
 Company 21, 22, 23, 24
 Goodyear, Truck Tire Dept. 5
 Great Lakes Diesel Co. 234
 Greenville Steel Car Company 133
 Hart & Hart 229
 Hauck Manufacturing Co. 222
 Henry Manufacturing Co., Inc. 203
 Frank G. Hough Co., The 173
 Huber-Warco Company 47, 143
 Hyster Company 224
 Ideker, W. W. 229
 Ingersoll-Rand 54 & 55
 International Harvester Company,
 Construction Equipment
 Division 112 & 113, 136 & 137
 International Harvester Company,
 Drott Division 102 & 103
 International Harvester Co.,
 Farm Equipment Div. 17
 International Salt Co., Inc. 144
 Iowa Manufacturing Company 171
 Jackson Vibrators, Inc. 218
 Jaeger Machine Co., The. 118 & 119
 Jerry & Sons Corp., V. S. 236
 C. S. Johnson 14 & 15
 Jurgensen Company, John R. 230
 Kinney Mfg. Division, The New York
 Air Brake Company 29
 Koehring Company 14 & 15
 Kolman Manufacturing Company 235
 Koppers Company, Inc. 223
 Kwik-Mix 14 & 15
 Lapine Truck Sales 234, 238
 Le Roi Division of Westinghouse
 Air Brake Co. 25 & 26
 LeTourneau-Westinghouse Co. 38, 39,
 40, 41, 42, 43, 74, 75, 162, 163,
 164, 165, 166, 167
 Liberty Mutual Insurance Co. 150 & 151
 Limestone Dayton Co. 238
 Link-Belt Speeder Corporation. 12 & 13
 Littleford Bros., Inc. 221
 Lubrecht III, William 232, 240
 Lubriplate Division, Fiske Brothers
 Refining Company 227
 Lufkin Rule Co., The 56
 Mack Trucks, Inc. 176
 Madsen Works-Baldwin-Lima-Hamil-
 ton Construction Equipment Div. 219
 Maginniss Power Tool Company. 132
 Maintenance Co., Inc., The 236
 Mall Tool Company 107
 Manitowoc Engineering Corp. 45
 Martin Implement Company 236
 Massaglia Hotels 243
 McConaughay, K. E. 227
 Meadows, Inc., W. R. 52
 Miller Machinery, Inc. 234
 Mississippi Valley Equipment
 Company 237, 239
 Monroe Equipment Corporation 231
 Morton Salt Company,
 Industrial Division 149
 Mutual Truck Parts Co., Inc. 236
 Nelson Tire Service, Inc. 238
 Oliver Corporation, The 51
 Overman Mfg. Co., I. J. 226
 Painton Associates, Inc., Eddie. 237
 Parsons 14 & 15
 Pershing, H. E. 240
 Pettibone Wood Mfg. Co. 177
 Philadelphia Transformer Co. 235
 Phillips Petroleum Company 172
 Pioneer Engineering, Division of
 Poor & Company, Inc. 206 & 207
 Piper & Son Construction Co., E. M. 230
 Porter, Inc., H. K. 242
 Portland Cement Association 158
 Prestite-Keystone Engineering
 Products Company 50
 Rae Steel Corp. 235, 240
 Reynolds Metals Company 27
 Riemer Bros., Inc. 235
 Roebbing's Sons Corporation, John A. 37
 Rolcor Industries 241
 Rosco 214
 Sanitary Wiping Cloth Co. 239
 Seaboard Steel Corporation, The. 232
 Servisite Products Corporation 34
 Shawnee Manufacturing Co., Inc. 92
 Sherman Products, Inc. 49
 Sinclair Refining Company 99
 Smalley Construction Supply
 Corporation 238
 Sonneborn Sons, Inc., L. 35
 Sonoco Products Company,
 Construction Products Division... 6
 Southern Tire Company 156
 Standard Oil Company (Indiana). 228
 Standard Steel Works, Inc. 225
 Stanhope, Inc., R. C. 229
 Sterling Rock Salt 144
 Stoddy Company 180 & 181
 Sun Construction Company 240
 Surplus Tractor Parts Corp. 233
 Sverdrup & Parcel Engineering Co. 229
 Swabb Equipment Co., Inc., Frank. 239
 Swenson Spreader & Mfg. Co. 226
 Sylvania Electric Products, Inc. 57
 Syntrol Company 56
 Tarrant Manufacturing Company. 220
 Tecon Products, Inc. 52
 Tennessee Coal & Iron
 Division 124 & 125
 Testa Bros., Inc. 234, 237
 Texas Company, The 8 & 9
 Texas Company, The—
 Asphalt Sales Div. Back Cover
 Thew Shovel Co., The 199
 Thor Power Tool Company 120
 Timken Detroit Axles 114 & 115
 Timken Roller Bearing Company,
 Rock Bit Division 18
 Tolp & Son's, John P. 236
 Tractor & Equipment Co. 232
 Troyer Equipment Company,
 Stanley B. 229
 Twin Disc Clutch Company 186
 Udelson Truck Sales, Inc. 230
 Unit Crane & Shovel Corporation. 108
 United Manufacturing Co., The. 185
 United States Rubber,
 Mechanical Goods Division 179
 United States Steel Export
 Company 124 & 125
 U. S. Truck Sales Co., The 232
 Vandeventer Auto Sales 235
 Vickers, Incorporated 53
 White Instrument Company, David. 241
 White Manufacturing Company 222
 Williams Manufacturing Co., Hugh B. 36
 Wilson Machinery & Supply
 Company 236, 240
 Wincharger Corporation 196
 Winter-Weiss Co., The 100
 Wisconsin Motor Corporation 192
 Work Bulls Division,
 Massey-Harris-Ferguson, Inc. 30 & 31

Why Mr. Thorn expects and gets high production from this No. 12!



Besides bank sloping, this Cat No. 12 Motor Grader maintains haul roads for DW21s and DW10s on the 9.2-mile realignment of U. S. 91 near Mesquite, Nevada. Note D8 in background.



PAUL A. THORN

"We have owned Caterpillar products since 1927," says Paul A. Thorn, President of Thorn Construction Co., Inc., Springville, Utah. "We're firm believers in them because of economy, minimum down time, long life and constant engineering improvement. We also think that Caterpillar Dealer service is in a class by itself."

Speaking from 29 years of successful experience, Mr. Thorn now has a Caterpillar line-up that includes thirteen D8s, five DW21s, two DW10s, seven Diesel Engines, one Diesel Electric Set and six No. 12s. This No. 12, with 9999 hours on its hour meter, was part of the company's rugged yellow team on a 9.2-mile realignment of U. S. Highway 91. The contract involved moving 1,500,000 cu. yd. of dirt. Working 10 hours a day, 5 days a week, the No. 12 contributed its full share to money-making production.

Now an even more productive CAT* No. 12 Motor Grader

As good a machine as this "old" No. 12 has proved itself, there's even *more* work at *lower* cost with *less* down time built into the new No. 12. Constant engineering improve-

... for more details circle 217, page 16

ment is the reason. For example, the new No. 12 has an exclusive oil clutch that can operate up to 1500 hours without adjustment. New tubeless tires, now standard, save time and money by eliminating an estimated 80% of down time due to tube and flap repair and by providing longer tire life. These and other features add up to a new standard of grader performance!

Another point well worth considering: your Caterpillar Dealer backs you with prompt service whenever and wherever you need it. He has the trained mechanics and parts to do the job *fast* and *right*. See him for complete facts about the practical, advance-design features of the No. 12. Name the date—he'll be glad to demonstrate!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**99% OF ALL
CAT MOTOR GRADERS
ARE STILL IN USE**

Heavy-duty Asphalt cuts cost of Massachusetts Turnpike



Constructing a heavy-duty, resilient Texaco Asphaltic Concrete pavement on 27 miles of the new Massachusetts Turnpike.

CONTRACTOR—The Bayer & Mingolla Construction Company, Worcester, Mass.

Massachusetts' 123-mile toll road, soon to be opened to traffic, has a heavy-duty, flexible Asphalt pavement. Designed for the heaviest traffic anticipated for this turnpike, Asphalt has saved millions of dollars in first cost, compared to other paving with the same load-carrying capacity.

The photograph shows a 3-inch hot-mix Texaco Asphaltic Concrete surface, constructed in two courses on 27 miles of the Massachusetts Turnpike. Supporting this surface are two 21½-inch layers of crushed stone, the upper one penetrated with asphalt cement by pressure distributor, the lower one sand-filled. Under this, there is a 12-inch gravel sub-base.

Texaco Asphalt products provide the road builder with answers to all his paving problems, whether he is building a heavy-duty pavement for a New England toll road, or a low-cost surface for a Wisconsin farm-to-market road. Helpful information on methods and materials recommended for all types of asphalt road and street construction is supplied in two booklets. Copies may be obtained without obligation by writing our nearest office.

... for more details circle 303,



MEMBER



THE TEXAS COMPANY, Asphalt Sales Div., 135 E. 42nd Street, New York City 17
Boston 16 Chicago 4 Denver 1 Houston 1 Jacksonville 2 Minneapolis 3 Philadelphia 2 Richmond 19

TEXACO ASPHALT